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PROCESSOR

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Providing A Complete Solution

Geist Evolves To Deliver An Integrated Solution To Manage Your Entire Data Center

IT BEGAN IN 1994. Data centers were the little-understood forces linking enterprise employees and customers to the data they needed. The Internet was in its infancy. And Geist, which has been in business since 1948, manufactured its first rackmount power strip.

“We were involved at the early stages of data center development, giving us the history to know the market trends when it comes to power,” says Sean Heyen, director of marketing at Geist.

Fast forward to today. Data centers are viewed as the lifeblood of many enterprises, essential to their success—or failure. The Internet has matured. And Geist has taken the same customer-centric approach that built its success in the power distribution unit (PDU) business and expanded to offer a complete lineup of data center solutions, including intelligent power strips, sophisticated cooling technology, and data center management software.

“Our experience in the data center put us in a position to enhance data center operations by bringing intelligent monitoring PDUs and climate sensing to the market,” Heyen says. “Giving managers data to protect equipment, ensure uptime, and anticipate challenges has been an essential evolution for the Geist business. Add in one of the most sophisticated cooling solutions in the industry and our Environet DCiM product, and we are offering a fully integrated data center solution.”

Customer-First Mentality

It centers on one goal: to bring customers the solutions they need by offering the widest array of options available.

“Too many times, customers have to choose from a limited set of products,” Heyen says. What separates Geist from competitors is its ability to fulfill the specific needs of a customer in the most timely fashion possible. “People ask what our best-selling product is, and we can’t really tell them because it’s spread across so many options as well as custom configurations.”

Geist has a team of account managers, engineers, and inside sales representatives that work with customers before the sale to help identify the challenges each customer faces and offer the best solution to meet their needs.

But the support doesn’t end after the sale is done and check has cleared. Geist



continues to support its customers for as long as they use Geist equipment.

Intelligent Hardware, Software

Geist’s product lineup includes both intelligent hardware and software to power, cool, monitor, and manage a data center. All of its products are made in the United States and feature industry-leading capabilities and technology. When combined, the products create a comprehensive system for maintaining your data center.

Power. Geist’s PDUs offer reliable power distribution with optional current and power monitoring so you can track onsite performance. The complete lineup includes basic, monitored, switched, and satellite power.

“One of our biggest advantages is our large breadth of standard products,” Heyen says. “We have well over 2,000 standard offerings.” The Geist website features a PDU Finder (www.geistglobal.com/pdu-finder) that lets you search Geist’s products by total receptacles, display, switch, breaker, and other features and get what you need in as little as three days.

Can’t find what you need? Geist can custom-build PDUs in as little as five days. “Geist’s PDU manufacturing process allows us to build to order, so customers have limited wait times for any of our standard products and very few days on custom units,” Heyen says. “This is unique in the marketplace. Our competitors aren’t doing or can’t do this,” he says. “And all products are offered at a reasonable cost to the customer.”

Cool. Geist’s AgileAir containment system uses a two-step process to maintain the

ideal temperature for your data center equipment. Expertly manufactured chimneys and enclosures work to contain heat, while sophisticated temperature and pressure sensors work to control fan speeds and exhaust hot air through the chimneys and directly to the CRAC units.

Because of Geist’s commitment to building a vast library of installation kits with cabinet tops, door blocking kits, and mounting hardware, AgileAir can work with almost any new or existing cabinet model or configuration.

“From slab floors to confined spaces, AgileAir contains single cabinets or rows to manage virtually any airflow scenario. It’s also one of the most efficient solutions in the industry,” Heyen says.

Monitor. Today’s data centers require constant monitoring of environmental conditions, and Geist’s lineup of climate monitors, sensors, remote management, and accessories can help.

Geist’s GBB15 climate monitor, for example, is a self-contained unit with onboard sensors to monitor temperature and humidity, and it can accept up to four external sensors. A Web interface lets you monitor conditions, set thresholds, and receive alert notifications when user-defined alarm parameters are exceeded. The GBB100 also supports one NO/NC relay contact, which can trigger external devices such as an auto-dialer.

Manage. With so many DCiM tools on the market, it can be difficult to find the right fit for your enterprise. Geist’s Environet DCiM software makes monitoring the data center easier than ever thanks to a graphically rich interface and intuitive design. Its Web-based user interface means you can access the program remotely.

The program can work with multiple types of equipment from many manufacturers and supports SNMP, Modbus, BACnet, and LONworks.

Environet can pull specific data from devices throughout a single data center or multiple sites, Heyen says, to formulate a single view of the entire data center. Environet goes beyond typical monitoring systems by providing predictive toolsets, so you can be alerted to potential problems before they become a catastrophe. Plus, Heyen says, “If a customer requires additional functionality, our engineers can build it.”

It all comes back to Geist’s commitment to its customers. “We’re not offering what we have to sell,” Heyen says, “we’re offering what our customers need.” ■



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COMPANY TO WATCH

Tackling Today's Air-Handling Challenges

Mestex Offers HVAC Innovations, Range Of Products For The Data Center Market

THERE'S A SEEMINGLY ENDLESS array of vendors providing solutions to help solve your data center cooling issues. How do you find a vendor you can trust? Industry experience is one of the best judges, and Mestex has no shortage of that.

“Our evaporative cooling product lines have been in existence for 66 years,” says Mestex President Mike Kaler. “We pre-date our competitors by at least 15 years.” Mestex uses that experience and knowledge of the industry to understand your unique data center cooling needs and provide the HVAC systems that will best match your needs and building type.

Unlike many cooling vendors, Mestex offers a complete line of data center

cooling products, including portable, direct evaporative, indirect evaporative, and packaged rooftop units.

Portable

The Koldwave products offered by Mestex are ideal for data centers in need of either permanent or semi-permanent cooling in server and telecommunications rooms, network closets, and any other area with cooling needs.

Koldwave products can provide between three-quarters ton and 5 tons of cooling and come in both water-cooled and air-cooled versions. A steel framework, stainless steel construction, and heavy-duty industrial casters make the units among the sturdiest in the industry. Color-coded connections simplify



installation, and digital controls with an optional IR remote control make management easy.

Direct Evaporative

The Alton Seasonal Make-Up Air Unit features a direct evaporative cooling option that's one of the most efficient ways to cool, changing warm dry air into cool air and costing about one-fifth the cost of mechanical air conditioning.

Indirect Evaporative

An indirect evaporative cooling unit, such as that found in the Aztec system from Mestex, uses a cooling tower and chilled water coil integrated in the unit, an approach that simplifies installation and data center infrastructure requirements. You can configure the Aztec to combine indirect evaporative cooling and fresh air cooling for greater energy efficiency.

Evaporative cooling units have traditionally been beyond the price range


of what small to mid-sized enterprises can afford. But the Aztec units solve that by providing self-contained, rooftop-installable, “bite-sized” units pre-engineered and preconfigured with digital control and monitoring software. Plus, the Aztec works with and without underfloor constructions.

Beyond managing the unit's temperature and pressure control via up to five cold-aisle temperature and one cold-aisle pressure sensors per unit, the digital control system monitors operation and provides service notices, temperature trend recording, and optional GUIs accessible onsite or via Internet access.



Packaged Rooftop Units

More than six years of research and design went into building the Applied Air Fresh Air Package from Mestex. It's a dedicated outdoor air system that can also be used with return air off of the data center hot aisle.

While most similar units can handle air up to 90 degrees Fahrenheit, the Fresh Air Package has been certified for up to 115 degrees, offering greater flexibility for raising your cold aisle temperature. The included DDC controls are compatible with BACnet, LON, N2, and Modbus. 

Company Name: Mestex
Location: Dallas, Texas
Phone: (214) 819-5221
URL: www.mestex.com



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FEATURED PRODUCT

High-Density Fiber Patching Taken To The Next Level

Siemon LC BladePatch® Offers Easiest Access In The Industry

SIEMON, AN INDUSTRY LEADER specializing in the design and manufacture of high-quality, high-performance network cabling solutions and services for data centers and intelligent buildings, introduced the new innovative LC BladePatch® fiber optic duplex jumper that revolutionizes high-density fiber patching with the easiest access available in the industry.

No Disruption Or Damage

With its intuitive, ergonomic action, the LC BladePatch completely eliminates the need to access a latch during installation and removal, avoiding any disruption or damage to adjacent fiber connectors in the tightest-fitting fiber patching environments.

With these innovative features, Siemon has taken high-density fiber patching to a whole new level:

- Patent-pending push-pull boot design that enables precise control of the latch away from the point of termination, enhancing installation and removal in the highest density applications


- Patent-pending rotating latch that eliminates potential connector and cable damage during polarity changes while clearly indicating that a polarity change has been made
- Overall smaller diameter uni-tube cable design that reduces cable pathway congestion for improved airflow, energy efficiency, and easy cable management

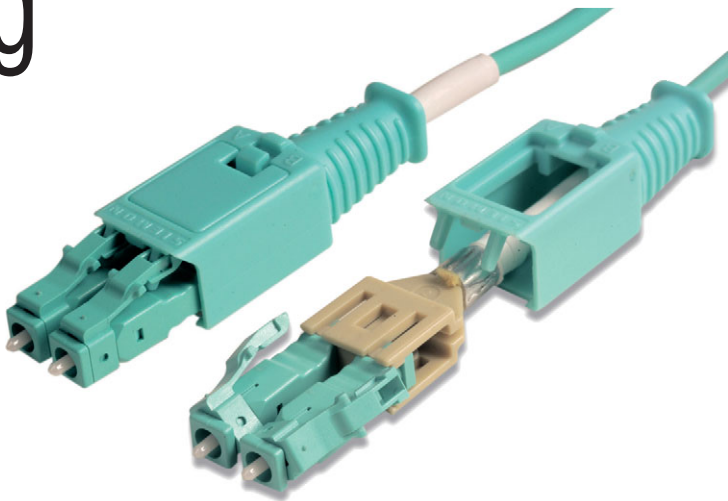
First In The Industry

“The LC BladePatch is like nothing the industry has seen for high-density fiber patching. Its push-pull action allows easy removal from the finger grip at the end of the strain relief boot rather than trying to access a standard LC latch and potentially disrupting adjacent connectors,” says Kevin Stronkowsky, Fiber Optic Systems Product Manager at Siemon. “LC BladePatch is truly the ideal solution for today's highest density blade server, SAN, and switch environments—whether Cisco, Brocade, Juniper, Enterasys, or any other industry-leading high-density system.”

Available with Siemon XGLO® OM3 and OM4 50/125 multimode and OS2 single-mode (UPC) optical fiber with OFNR, OFNP, and LSOH constructions, the LC BladePatch is ideal for supporting high-speed 10Gb fiber applications over extended distances and next generation backbones. It features a superior connector polish that meets stringent Telcordia and ISO/IEC end-face specifications and exceeds all ANSI/TIA and ISO/IEC insertion loss and return loss requirements.

For use within any standard duplex LC adapter opening or LC small-form pluggable (SFP) module, the LC BladePatch is 100% factory inspected to deliver precise optical performance and is warranted for 20 years to ensure optimum 10Gb Ethernet serial transmission when installed in a qualified XGLO system.

Learn more about the Siemon LC BladePatch duplex jumpers at www.siemon.com/LCBladePatch. 



Siemon LC BladePatch

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www.siemon.com

The LC BladePatch fiber optic duplex jumper has an intuitive, ergonomic action that eliminates the need to access a latch during installation and removal.

It features:

- A patent-pending push-pull boot design
- A patent-pending rotating latch
- An overall smaller diameter uni-tube cable design



CASE STUDY

Storage Put To The Test

“Can Do” Attitude Helps Area Data Systems Develop A Solution Ideal For University

LIMITED BUDGET. GROWING STORAGE NEEDS. It’s a scenario that’s all too familiar in today’s enterprises. Public educational institutions such as Kansas-based Washburn University often face even greater challenges. “We’re very careful with our money and work hard to get the best value for the money we do spend,” says Kevin Halgren, assistant director, systems and network services.

The university had a problem. “We had a number of legacy siloed storage systems that were generally tied to equipment purchased for specific purposes,” Halgren says.

This siloed storage prevented the university’s IT department from quickly and cost-effectively meeting changing needs. “We might have storage capacity in one location, but we couldn’t make it available where it was needed elsewhere. We also had some very high-performance storage capable of remarkable IOPS, but we couldn’t connect that to the systems that really needed it,” Halgren says. To top it off, the “system would basically be unresponsive” at key times because it couldn’t handle the load.

Doing Homework

Halgren did his homework when looking for a solution. He found a number of good SAN solutions, but Washburn University’s size meant it couldn’t really benefit from



SAN’s economies of scale. “Additionally they were just outright expensive,” Halgren says.

Halgren’s research lead him to the open-source ZFS file system and Nexenta. The Washburn IT department built and tested a storage setup based on the community edition of Nexenta on some “rickety old hardware we had lying around,” Halgren says. “The results we got on that hardware blew us away. It also gave me confidence in the ability of Nexenta to meet our needs.”

Halgren sent out an RFP for an integrated solution meeting the university’s needs. Area Data Systems responded with the most cost-effective proposal.

Lynn Cress, the university’s senior systems and network administrator, says Area Data Systems’ promise of long-term support made the decision easy. “They provided an integrated software/hardware package and would come in, do the install, and

participate in training alongside Nexenta—something we would not get with just purchasing the software and rolling our own hardware solution . . . We liked the ‘can do’ attitude that Area Data Systems put forth.”

As an added bonus, Halgren says, “Area Data was willing to work with us when we talked about integrating third-party legacy storage into the system. Sure they couldn’t guarantee everything when it wasn’t their equipment, but just having someone willing to listen and offer advice we recognized would be incredibly valuable.”

The Answer

The solution from Area Data Systems combines NexentaStor software with DataON JBODs. The initial setup was a two-node cluster, both with 12 processor cores, 192GB RAM, 256GB SSD ARC cache extension, 8GB STEC ZeusRAM, and 10Gb Ethernet Fibre Channel HBAs with about 70TB of storage. The system has since been expanded to between 80 and 90TB of storage, Cress says, with plans to add another JBOD in the future.

The DataON OS-agnostic JBODs provide the mass storage, serving as the foundation for the high-availability, high-performance, and cost-effective storage. The system also takes advantage of the DataON Disk Shelf Management (DSM) 3.1 monitoring solution

that helps the user spot hard drive failures and detect the drive’s location within the array.

Passing The Test

Washburn University is pleased with Area Data Systems’ architected storage solution and has had “plenty of chances to put it to the test,” Cress says.

“We had a few fits and starts,” he says, but Area Data Systems has always been responsive and easy to work with. “It’s just good to know I can shoot off a question in an email and get a quick response,” Cress says. Halgren adds, “When we do call for support, it’s nice to know we’ll be dealing with the same person as before.”

How has it performed? “In many ways, I’m surprised that we’ve been able to do pretty much everything I’d hoped it could do for us,” Halgren says. “I expected we’d have some less critical capabilities we’d have to back off of once we tried it, but that really hasn’t been the case.”

Area Data Systems

As a Nexenta Premium Partner, Area Data Systems designs tailored storage solutions to meet a company’s unique needs. Solutions can combine the NexentaStor software and industry-standard hardware such as that offered by DataON Storage.

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FEATURED PRODUCT

More Outlets. More Flexibility. Highest Quality.

The ProGrade 42 Mixed-Outlet Smart PDU Lets You Pack More Power & More Devices Into Your Data Center

HAVE YOU EVER needed to fit more devices into a cabinet and just didn’t have the available power to do so? It’s a challenge most enterprise data centers are facing as they work to provide the server and storage capacity their businesses demand.

Lack of available power shouldn’t be the limiting factor anymore with the 42-outlet ProGrade 42 smart PDU from PDUs Direct. It combines a large number of outlets in a small form factor, so you can add 30% more devices in a cabinet, according to PDUs Direct.

Built On Experience

PDUs Direct is a master distributor of select basic, metered, and switched data center rack PDUs from Server Technology, which has about 30 years of experience in designing high-quality products that are 100% performance-tested for reliability and accuracy.

The ProGrade 42 is the first-ever PDUs Direct-branded product and builds on the experience both it and Server Technology have gained in designing products that solve customers’ power problems. PDUs Direct focuses on providing premium power distribution without the premium price, offering best-in-class pricing and organized, informative, and fast service and support. As a customer, that means

you’ll get a quality product, delivered fast from a company you can trust.

Unique In The Industry

The zero-U rackmounted ProGrade 42 has several features that make it unique in the industry. The mixed outlet base ensures you can connect routers, switches, blade and traditional servers, and other equipment into the same PDU. It comes with 36 C13 outlets for traditional devices and six C19 outlets for high-power blade servers.

“Mixed outlets are a nice feature. With both the C13s and C19s, you have great flexibility in how you configure your rack equipment,” says Jim Scherr, director of sales and operations at PDUs Direct. “It’s very flexible with the mixed outlets, it’s very universal with the large number of outlets and how they’re spaced, so the customer can get whatever outlet he needs no matter where he’s putting in his equipment.”



The ProGrade PDU is encased in steel for the highest quality. A middle display can be inverted to make it easy to read whether you use overhead or under floor power. When you pair the ProGrade 42 with PDUs Direct’s locking power cords, you know your servers will stay safely plugged into the cabinet PDU and its next-generation locking receptacles.

Available Capacities, Features

The ProGrade 42 is available in several different capacities, including 208-240V 30A, 230V 32A, three-phase wye 208V 30A, 400/230V 32A, and 415/240V 30A. Depending on the model, you’ll find several additional features, including:

Per-inlet power sensing. View current load (A), voltage (V), power (kW), apparent power (VA), crest factor, reactance, accumulated energy (kWh), and power factor per inlet.

Link to an expansion CDU. Connect your ProGrade

42 to an additional link unit using a single IP address with up to four temperature and humidity probes.

Network monitoring. View power, temperature, and humidity levels via a Web browser and receive SNMP-based and email alerts when conditions exceed defined thresholds.

Input current monitoring. Digital LED displays report the input current of each phase or branch circuit to help prevent overloads in high-density environments.

Branch circuit protection. All PDUs Direct PDUs are certified to the UL 60950-1 standard.

Button mounting. The zero-U button lets you mount the PDU in the back or on the side of a cabinet.

PDUs Direct ProGrade 42

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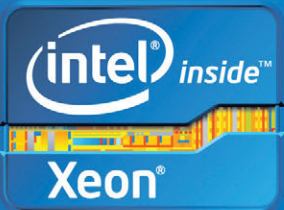
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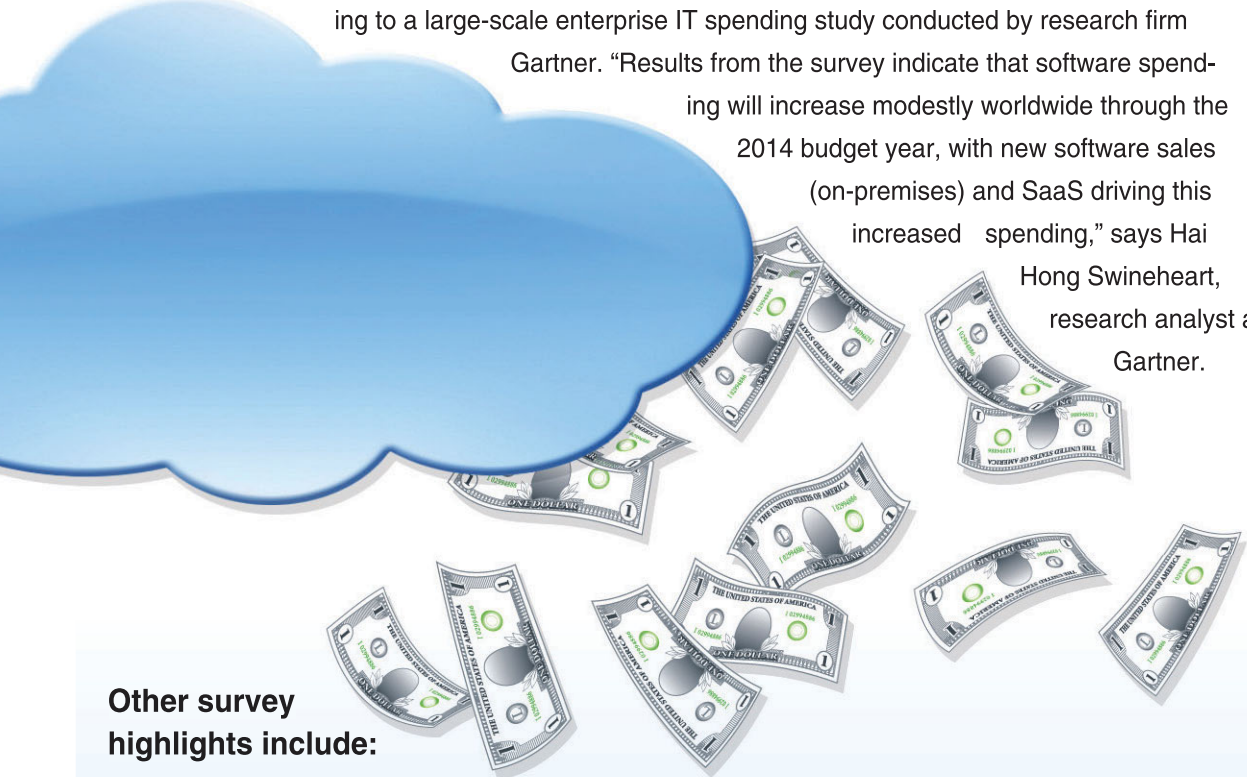


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Cloud, CRM To Drive Enterprise Software Spending

Worldwide spending on enterprise software will increase slightly through 2014, according to a large-scale enterprise IT spending study conducted by research firm Gartner. “Results from the survey indicate that software spending will increase modestly worldwide through the 2014 budget year, with new software sales (on-premises) and SaaS driving this increased spending,” says Hai Hong Swineheart, research analyst at Gartner.



Other survey highlights include:

60%. The number of respondents who expect to increase their budget for SaaS/public cloud within the next two years.

CRM, ERP, and office/personal productivity tools. The top three application software investment initiatives for this year.

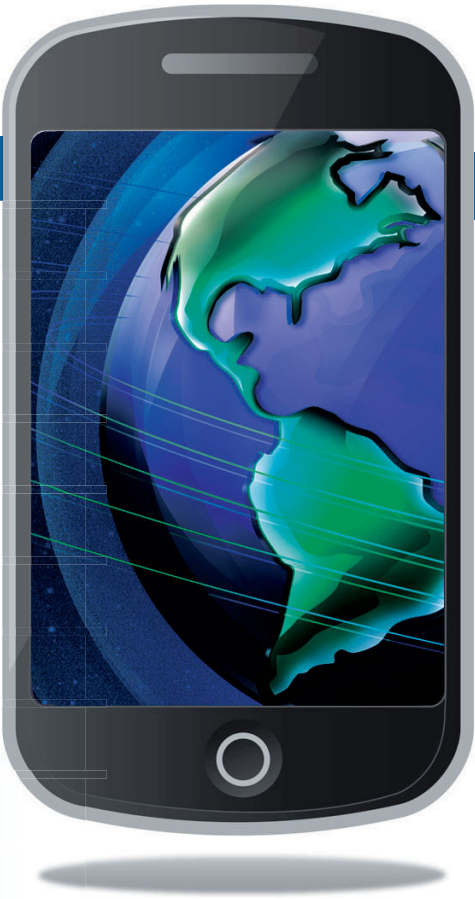
North America and Western Europe. Two regions with “higher IT maturity” that expect lower or no budget increases over the next two years.

Eastern Europe, Latin America, and Asia/Pacific. Regions with “immature IT infrastructure” that will have the largest increases in software spending.

Smartphones vs. Feature Phones In Worldwide Usage

Nielsen recently released a report detailing how people use their mobile phones around the world. Included in the report was a look at the types of phones in use. This chart compares the percentages of the populations of various countries that use smartphones vs. feature phones, or mobile phones that have smartphone-like features but lack a full-fledged smartphone OS.

	Smartphone	Feature Phone
Australia	65%	31%
Brazil	36%	44%
China	66%	25%
India	10%	80%
Italy	62%	27%
Russia	37%	51%
South Korea	67%	23%
Turkey	19%	61%
United Kingdom	61%	30%
United States	53%	38%



IT Spending Remains Strong, Says IDC

In its newest “Worldwide Black Book,” IDC reports that despite a confluence of numerous economic difficulties toward the tail end of 2012, IT spending remained strong for the year. Specifically, IDC reports 5.9% annual growth for IT spending in 2012 (with \$2 trillion in total spending for software, hardware, and services), about the same as the 5.8% figure reported for 2011. According to Stephen Minton, vice president for IDC’s Global Technology and Industry Research Organization, IT spending continues to grow “organically, but not at the same pace as prior to the financial crisis. Businesses are adopting IT solutions such as virtualization, automation, and SaaS as a means to reduce the annual increases in their overall IT spending at a time when economic uncertainty remains high.”

Report: Use H-1B Visas To Attract “Best & Brightest”

Proponents of H-1B visas say the program helps them attract the best and the brightest and fill in where there are genuine labor shortages. But that’s not always the case, according to a report from the Economic Policy Institute that looked at former foreign students now working in the United States. On a variety of measures, the report found that “the former foreign students have talent lesser than, or equal to, their American peers.” In addition, the Economic Policy Institute reports that “skilled foreign worker programs are causing an internal brain drain in the United States.” The institute recommends changes to the legal definition of the prevailing wage and what constitutes a “qualified” worker as ways to ensure the H-1B program is utilized as intended.

Mobile Phone Sales Down In 2012

2012 year-end data on worldwide mobile phone sales, recently released by research firm Gartner, shows that the market was down 1.7% from 2011. Smartphones dominated the market, with fourth-quarter 2012 sales up 38.3% from the same quarter a year earlier. Sales of feature phones, though, were down 19.3% year-over-year. “Tough economic conditions, shifting consumer preferences, and intense market competition weakened the worldwide mobile phone market this year,” says Anshul Gupta, principal research analyst at Gartner, noting that 2009 was the last time the worldwide mobile phone market declined. Gartner predicts that about 1 billion smartphones will be sold this year, with total mobile phone sales reaching 1.9 billion units.

Mobile Content Revenues Soaring

The term OTT (over-the-top) took hold in recent years as it applied to third-party messaging apps; a user could download such an app to his smartphone and use it in lieu of the integrated messaging service operated by his phone’s wireless carrier, effectively using the carrier’s wireless capabilities but otherwise leaving the carrier out of the pay equation. Now OTT is more broadly understood as mobile apps and services not controlled by wireless carriers. According to a new Juniper Research report, OTT stores are beginning to squeeze out carrier stores. Google’s Play and Apple’s iTunes Store, for example, together comprise 70% of the market, Juniper states, while carrier storefronts claim 6% of app/content downloads. Carriers are making up for the hit with direct carrier billing, however; Juniper expects such revenue to increase from \$2 billion in 2012 to more than \$13 billion by 2017.



Gartner: Business Intelligence Market Has “Unmet Demand”

Worldwide sales of business intelligence software should be up 7% this year, according to Gartner. “Although this is a mature market and has been a top CIO priority for years, there is still a lot of unmet demand. Every company has numerous subject areas—such as HR, marketing, social, and so on—that have yet to even start with BI and analytics,” says Kurt Schlegel, research vice president at Gartner. Gartner analysts expect that BI and analytics platforms will remain one of the fastest-growing software markets, although near-term growth could be slowed by a sluggish economy and a smaller number of multi-million-dollar BI deals.

IDC: Global PC Shipments End 2012 On “Sour Note”

Global PC shipments were down 3.7% last year, research firm IDC reports. Shipments dropped 8.3% year-over-year in the fourth quarter, which IDC states is the “most substantial decline recorded for a holiday quarter.” Limited traction from Windows 8 and surging tablet sales mean PC shipments will

continue their downward trend this year, with IDC predicting shipments to decline 1.3%. In its report, IDC notes that 2012 was the first year where emerging markets saw a decline in volume; IDC expects emerging markets to report “modest, single-digit growth through 2017.”

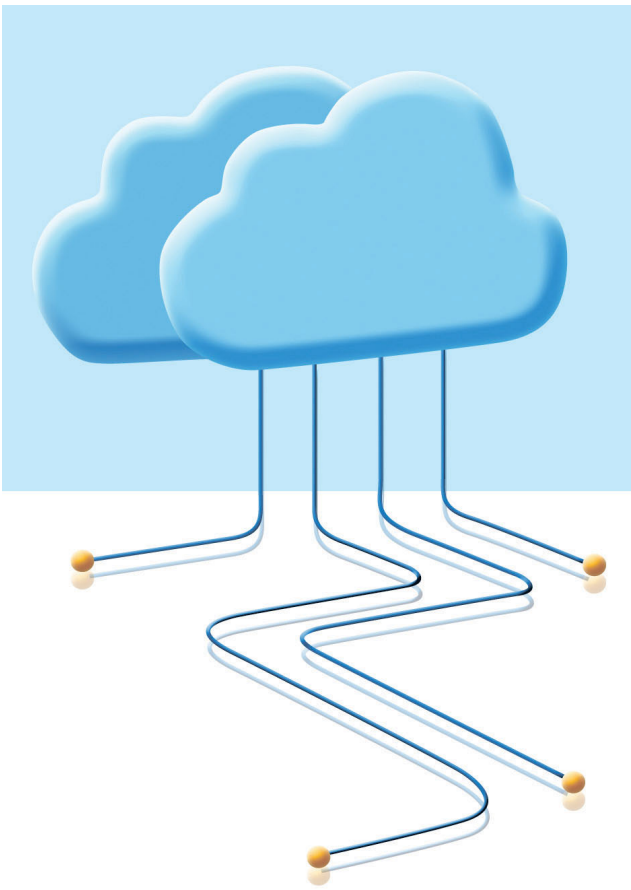
Server Shipments Up, Revenue Down

Budget constraints in 2012 meant enterprises and midsized data centers delayed replacing their x86-based servers, according to Gartner. But server sales to application-as-a-business data centers drove growth up 1.5% last year, Gartner reports.

Weak sales of mainframe and RISC/Itanium servers caused server revenue to be down 0.6% for the year. North America, Asia/Pacific, and Latin America were the only regions to have an increase in shipments last year, according to Gartner. The research group expects continued modest growth this year, as enterprises replace aging servers as the economy improves.

Companies Improving Their Cloud Security

Businesses are doing a better job with cloud computing security, but there’s still much room for improvement in their use of security best practices and awareness of what cloud services they use. Those findings are part of a recent study conducted by the Ponemon Institute. About 46% of respondents say security concerns have stopped or slowed their adoption of cloud services. When it comes to who is responsible for cloud security, there’s widespread lack of agreement, with cloud services providers, company end users, and IT security groups all reported as having ownership. One positive sign is that more companies are reviewing the security arrangements before settling on a cloud provider, according to Ponemon. In a similar survey conducted in 2010, about 45% of respondents said they performed such a review; in the 2013 study, about 50% reported doing so.



Report: Big Demand For All Things Cloud

Backed by strong demand for all types of cloud offerings, the public cloud services market will grow 18.5% this year, Gartner reports. Last year, infrastructure as a service offerings such as cloud compute, storage, and print services were the market’s fastest-growing segments, up 42.4% from 2011. Gartner expects that segment to be up another 47.3% this year. Cloud advertising is the largest overall segment, accounting for 48% of the public cloud services market, followed by the business process services segment, cloud application services, cloud system infrastructure services, cloud management and security services, and cloud application infrastructure services.

Smaller Tablets, Larger Smartphones This Year

Citing more affordable pricing and ease of handling as the two primary factors drawing consumers to smaller tablet computers, NPD DisplaySearch suggests that smaller tablets (those with 7- to 9-inch screens) may overtake larger ones (typically with 9.7- or 10.1-inch screens) in sales this year. Looking at shifts in sales from December 2012 to January 2013, NPD DisplaySearch found, for example, that 9.7-inch display panel sales declined sharply from 7.4 million to 1.3 million, while sales of 7- and 7.9-inch display panels increased from 12 million to 14 million. In its “Quarterly Worldwide FPD Shipment and Forecast Report,” the research firm also suggests that as manufacturers produce smartphones with larger screens, larger smartphones could cannibalize the market for smaller-screen tablets.

Improve Your Understanding Of Cloud Computing

Avoid Future Issues Through Research, Communication & Realistic Expectations

CLOUD COMPUTING can be confusing, with multiple models, different types of cloud services, and perceived money-saving features that may be too good to be true. When comparing the available cloud services, you need to find a solution that will fit your data and applications needs but won't cause you to compromise on security or cost. Also, be sure the service you sign up for is a bona fide cloud computing environment.

✔ *Cloud Computing Definitions*

The National Institute of Standards and Technology (NIST) states that a cloud environment should enable "ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources." Users should be able to monitor

the environment and receive "rapid elasticity" and "on-demand self-service," according to NIST. Cloud computing has three service models (SaaS, PaaS, and IaaS) with four deployment models (private, community, public, and hybrid).

There's little debate that a true public cloud holds all of the characteristics of the NIST definition, but things get murky when you move to private clouds or the private portion of a hybrid cloud.

"If you enter into an outsourcing arrangement with a private cloud vendor where a hosting company essentially gives you access to infrastructure but it isn't really as pay-per-use and elastic as that public cloud model, then that maybe by the strictest definition is not really a cloud,"

says John Sloan, lead research analyst at Info-Tech Research Group. But he adds that if your "cloud strategy is to abstract stuff away, manage the abstractions, but not the hardware, and move toward a scalable elastic model" and you're reaching those goals with the private cloud, then it may not matter whether it fits the true cloud definition.

✔ *Security Considerations*

Security concerns are one of the biggest reasons companies say that cloud computing isn't as easy or seamless as it should be. The first issue is with data security and the transparency of your cloud vendor.

Dave Bartoletti, senior research analyst at Forrester Research, says if your cloud

provider can't clearly tell you how it is managing your data or what security measures it has in place, then you might want to consider a different vendor.

Jay Heiser, research vice president at Gartner, says that regulatory compliance is also a pressing issue. "Let's not forget about security, but let's recognize that there are issues, and the regulatory compliance one is more complex than security," he says. "It all comes down to control and having the flexibility to know where your data is, what it's condition is, and being able to change it at will."

Many cloud providers are taking strides to make their security solutions stronger and provide other data protection services. For instance, Gene Ruth, research director





at Gartner, says some mid-sized companies that might not be backing up and protecting their data at all can sign up for a cloud service and get the automatic capabilities of built-in data protection and disaster recovery. But you will more than likely pay extra for such features, which could negate some of the potential cost savings.

✓ *Ease Of Use*

There's a concern that moving to the cloud isn't as simple as previously thought. A recent study from KPMG International, for instance, reported that a third of companies that used the cloud found that their internal infrastructure required adjustments they hadn't foreseen before implementing a cloud environment.

Companies that haven't jumped into the cloud need to do their due diligence upfront to make sure they don't enter into a misleading arrangement. Speak to your vendor to see what services it provides, ask what the migration process is typically like, and make sure the provider will help if you run into snags.

Be sure to choose the solution that's right for you, rather than trying to make your infrastructure fit the requirements of a specific service. "Cloud computing solutions typically have the advantage of being rapid to deploy with low capital cost barriers up front," Sloan says. "Software-as-a-service can be rapidly deployed and scaled to multiple users without having to buy any hardware and wait to have it installed, configured, and tested."


✓ *Money-Saving Benefits*

Cloud computing doesn't always live up to its money-saving moniker. Some cloud solutions claim that "they are easy and cost-effective to launch, but that doesn't mean you're going to save money overall," Sloan says.

"Once you're in the cloud and the meter starts running, total accumulated costs over time continually add up to the point where the total cost [of the cloud] will rival the total cost of a non-cloud solution," he says. "In fact, costs can get so high that companies may find over a three- to five-year period that they could've purchased quite a bit of on-premises storage for the same amount."

It comes down to keeping costs in mind and understanding you need to

maintain control over how much data is put into the cloud to avoid going over your intended capacity and incurring even more costs in the future, says James Staten, vice president and principal analyst at Forrester Research.

"Cloud platforms incur cost every hour for everything you're consuming, which means that if you're consuming resources that you don't need, the bill is going to go up and up and up," Staten says. "That can be from storing things you don't need to store, leaving applications running, and it can also come down to application design where you designed your application thinking that you needed 20 virtual machines where you really only needed five." 

✓ *Move The Right Apps To The Cloud*

One of the best ways to make sure your move to the cloud is as smooth as possible is to migrate the right data and applications. For instance, sensitive data may not have a place in the cloud because of security concerns, and applications that don't run well on your in-house infrastructure will actually "run much worse in the cloud," says James Staten, vice president and principal analyst at Forrester Research.

"You want to think about an application that is suited to a cloud platform so architecturally it can solve its own reliability issues, where it does not need a highly stable, highly reliable SLA," he says. "And ideally you want applications that fit the economic model of cloud computing."

✓ *Communicate With Your Provider*

To avoid cloud computing problems in the future, speak to your vendor upfront and make sure that it has answers to every question you may have.

"When you start to use cloud services, managing that service is now a shared responsibility," says John Sloan, lead research analyst at Info-Tech Research Group. "You have to make sure it's very clear where your responsibility ends and where their responsibility begins. If that isn't clearly mapped out and understood in the contracts and SLAs, then you'll have problems down the road where maybe the application goes offline or there's a problem with the hosting provider with IaaS and all of a sudden a key service goes offline. These things should be worked out in advance, and often they're not."

BONUS TIPS:

✓ *Don't Dive In Headfirst*

"Dipping is good, but shutting your eyes and leaping is ill-advised," says Jay Heiser, research vice president at Gartner.

"The issue, as I see it, is not just that the providers lack transparency, but it's also that the buyers just don't know what they need. If you don't know what your requirements are, you will never determine if a provider can meet them. Some things change over time. When we do things in-house, we make a lot of assumptions about the levels of service we get, not the least of which is a certain amount of flexibility to do something different than what was agreed upon originally."

✓ *Centralize Branch Control*

"Cloud can be really interesting, particularly if a company has lots of branch offices, those are usually hard to support when you put on-premises storage in all those offices," says Gene Ruth, research director at Gartner. "But if you put gateways or something like a gateway in those branch offices, they're easier to consolidate to a centralized cloud location and protect that data," he says.

Make A Plan To Handle End-Of-Life Equipment

Improve Your Processes To Obtain Cost Savings & Better ROI

HAVING AND EXECUTING equipment decommissioning and asset-recovery processes is vital for numerous reasons, including those related to procurement, maintenance, security, compliance, and the environment. Arguably, the most important reason is recouping costs on the equipment you are retiring via the resale or recycling of systems and components.

Although some enterprises shine in the procurement and maintenance phases, they fall short in the disposition of assets. As Nick Valliere, project manager at Critical Power Exchange (877/630-7520; www.criticalpower.com), says, it's still very common for retired equipment to end up in our landfills. To boost your decommissioning and asset-recovery processes, consider the following.

Why Worry About E-Waste?

Some estimates suggest there are upward of 600 million obsolete computers in the

United States alone. That would be enough to span six acres and stretch a mile high. Other estimates state 80% of U.S. e-waste ends up in landfills, while globally 40 million tons winds up in dumps or is incinerated annually.

Two particularly startling estimates state that only 10% of unwanted computers are properly recycled, and more than 70% of discarded electronics are shipped overseas to developing countries with few, if any, safety regulations. This includes e-waste that U.S. recyclers ship to countries where unprotected locals burn, tear apart, dump, and bury electronics. These processes expose workers, communities, wildlife, water resources, and crops to the hazardous materials the e-waste contains. (Many estimates, for example, proclaim one computer contains as much as four pounds of lead, sometimes more.)

Key Points

- Implementing and executing solid decommissioning and asset recovery processes is vital for reasons related to ROI, compliancy, security, maintenance, and procurement.
- Working with a qualified third-party service provider can decrease IT's decommissioning/asset recovery workload while helping the enterprise with ROI and cost savings on retired and new equipment.
- A well-managed decommissioning process can provide benefits where redeploying assets, software licenses, leases, data security, and recycling are concerned.

Steps To Take

From an IT perspective, dealing with outdated equipment should be part of overall

disposition planning you do within a hardware asset-management program, says Darin Stahl, Info-Tech Research Group analyst. Dealing with outdated equipment should “just be an outcome of your end-to-end hardware asset-management program, and just one of the disposition options. Plug it into the backend of that process and don't make it a one-time event or fire sale or yard sale every spring,” he says.

Proper handling of e-waste begins with the purchase of electronics that have “green” (environmentally friendly) traits. One resource that assists in this effort is the Electronic Product Environmental Assessment Tool (EPEAT; www.epeat.net), which maintains a registry of green electronics. After purchasing electronics, businesses can implement any number of monitoring and management tools aimed at enabling more efficient energy use. The Federal Electronics Challenge (FEC) and Energy Star also offer resources via their



Web sites at www.epa.gov/fec and www.energystar.gov.

Once electronics become e-waste, the primary methods for responsibly handling the devices are to reuse or recycle them. Reuse can be as simple as donating old electronics to schools, churches, or other organizations.

Know Your Options For Getting Rid Of Used Equipment

One of the most common methods for getting rid of used equipment is a fire sale, but many data centers will need to be aware of who they are selling to.

“A less time-consuming method is to sell to one of the many companies that exist by buying used servers and equipment and refurbishing them,” says Brett Femrite, director of business development

for Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). “Bear in mind, often you will receive pennies on the dollar for this equipment, but normally the buyer will pay to pick it up and ship it to their facility and get it off your hands.”

Another option is an asset recovery program, which is a service that performs both the IT asset buyback as well as the physical recycling of hardware. Some vendors will even create a fund for your organization so that the money you gain from selling used hardware can be used to purchase recertified equipment when you need new hardware.

What To Look For In A Third Party

When seeking a company that will help with your asset disposal, “Look to

work with companies with a reputable asset recovery or refurbishing program,” Femrite says. “They can often provide help in determining the value and final disposition of your unused IT assets and offer a variety of options to suit your needs.”

Qualified IT asset disposal service vendors will assist your company and take over the responsibility for certification and compliance. Plus, these service providers can provide you with a variety of options for handling your various types of storage media. For example, let’s say that you want to shred a bunch of old tape drives, CDs, and mobile phones, but you want to merely wipe the data off old hard drives so that they can be reused in other parts of your data center or donated to worthy causes. Most data destruction services offer you a combination of degaussing and

shredding services in both onsite and off-site variations.

Valliere says that often the contractors enterprises hire for equipment removal also take the equipment, but “electrical, demolition, and mechanical companies don’t have the resources available to resell this equipment, and the equipment is thrown away.”

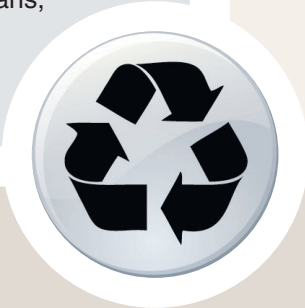
Having plans in place ensures hazardous materials are handled and managed by licensed professionals and liability doesn’t fall back on the enterprise. “It also ensures that timelines and deadlines can be met when the time comes to have a quick turnaround,” Valliere says. Waiting until the last minute to manage everything a decommissioning process involves can ultimately cost more money, he says. “‘Urgent’ timelines always increase a contractor’s cost,” he says. P

Top Tips

- ✓ **Properly handle hazardous materials.** Nick Valliere, project manager at Critical Power Exchange (877/630-7520; www.criticalpower.com), says environmental factors pertaining to hazardous materials and properly managing and disposing of such materials should be a big concern. “In the data center environment, the most common hazardous materials are batteries, refrigerant, fire suppression, diesel fuel, and transformer oil contaminated with PCBs,” he says.
- ✓ **Know what you have.** If you’re looking to get rid of or repurpose old equipment, you first need a better understanding of what equipment you have and how it’s being used. “You should identify and know what equipment you have on hand, what’s operational, and what’s been abandoned or is under- or unused,” says Brett Femrite, director of business development for Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). “You can’t do much to get rid of unused equipment until you have completed a thorough audit and identified what can be removed.” The inventory auditing process can be both tedious and time-consuming, as you’ll want to check out all equipment, including fans, shelves, cables, and wires.

Action Plan

- Bring together all pertinent parties
- Ensure decommissioning and asset management plans are in place
- Ensure that plans make data removal a high priority
- Monitor all assets with impending costs and potential liabilities
- Consider hiring a third party that addresses data removal and maximizes the value of systems and components through resale and recycling



Get Started

The EPA (tinyurl.com/6q5nksg) and National Center For Electronics Recycling (NCER; www.electronicrecycling.org) provide resources for finding local, manufacturer- and retailer-, and government-supported reuse and recycling programs. The EPA’s Plug-In To eCycling program, for example, helps develop reuse and recycle programs through national and local partners. Where recycling is concerned, it’s important for businesses to understand what local and state regulations require. The EPA offers information on the topic, as does the NCER and National Electronics Recycling Infrastructure Clearinghouse (NERIC; www.ecyclingresource.org). According to NCER, 25 states currently have laws concerning how e-waste should be handled.

Arguably, two of the most important recycling-relating issues businesses should consider include making certain that data is disposed of on old electronics before recycling and that decision makers select a recycler that handles e-waste responsibly as opposed to shipping electronics to impoverished nations with potentially little to no oversight in place.

SIX QUICK TIPS

Build An Environmentally Friendly Data Center

Considerations For Renovations & New Builds

AMPLE RESEARCH AND EVIDENCE compiled in recent years suggests there's much to gain by implementing environmentally friendly features and components when renovating or building a new data center. Here are some benefits and considerations to keep in mind as you're looking at whether these improvements make sense for your data center.

✓ *Explore The Alternatives*

Considering the capital costs involved and colocation and cloud computing services available, it's natural to ask if building a new data center even makes sense. Even the smallest and least-resilient designs can cost several million dollars, says Andy Lawrence, vice president of

research for data center technologies at 451 Research. As such, building a new data center often isn't an option for smaller companies. Medium-sized organizations, however, may have good reasons for doing so, including security, use of specialist computers, proximity requirements, connectivity and power availability, and tax efficiency and capital appreciation, he says.

Overall, Lawrence says, building small, isolated data centers doesn't make great sense. Companies considering doing so should look at prefabricated modular designs, which can be energy efficient, or leasing dedicated space inside a larger wholesale data center provider, he says.

Jenna Maertz, research analyst at Info-Tech Research Group, says while colocation and cloud services can be tempting when you need to increase capacity, there are situations where building a data center is the right call.

Although cloud computing can seem cheap upfront, for example, projecting costs out for years two through six may show the assumption isn't entirely accurate, and you might "pay significantly more for cloud storage than you would be if you hosted it onsite," she says. Latency and compliance and privacy concerns can also necessitate hosting data onsite. "You lose latency when you use cloud services, and that is fine for some applications, but others will require that near-real-time latency," Maertz says.

✓ *Weigh The Pros & Cons*

There's no hard-and-fast rule to determine if a new build is a better option than a retrofit, Lawrence says. Generally, he says, small legacy data centers are inefficient compared to modern ones, while layout and integrated cooling and power systems can make retrofitting difficult—a situation that may require consulting with a specialist engineering firm. A big factor will be the extent to which existing operations are disrupted, he says.

Anu Elizabeth Cherian, senior industry analyst at Frost & Sullivan, says ROI is the real deciding factor. Companies have adapted to the low-spending market scenario to offer systems that serve as a retrofit to



existing systems and enable phases of change, she says. “This serves well to get started on the new platform, as well as enable smaller initial investments. Nevertheless, it sets [companies] on a path toward changing the total efficiency of the system,” she says.

Maertz says most organizations begin renovating a data center after about 7-1/2 years, although the longer the wait, the more expensive it becomes. “At some point, the cost of renovating will overtake the cost of starting new,” she says. “As technology changes, the data center’s design requirements change, and the cost of updating them may be higher than the cost of starting new.”

Cherian adds that only a certain amount of backup power equipment will

fit in a given space. Once maxed out, the data center is in an expansion phase and there’s little point in investing in the existing setup.

✔ *Involve The Right People In The Process*

Renovations and new builds can be huge, complex endeavors. As such, be sure to involve executive management, facilities, and IT heads, Lawrence says, and enlist any corporate social responsibility personnel in an advisory role to ensure options for improving the environmental sustainability aren’t missed.

Maertz says to consider external help. “Knowing how a data center runs, knowing its daily rhythms isn’t enough to know

how to build a data center.” Acquiring necessary specialty skills may mean hiring a consultant. If hiring general contractors, she says, ensure they have specialized data center knowledge.

✔ *Consider These Elements In A Renovation Or Build*

Floor space and layout are two areas where you can implement environmentally friendly touches in renovations and new builds. Use designs that keep energy usage to a minimum, efficiently handle heat ejection, and support the processing needs, Lawrence says.

“In most cases, this will be a hot aisle/cold aisle layout with enclosures to ensure there’s good airflow,” he says. “Raised

floors are less common than they were and can be more expensive, but they can provide more flexibility in the long-term.”

Nearly all new data centers can benefit from using free air cooling and evaporative (or adiabatic) cooling, Lawrence says. When combined with operating the data center at the higher end of recommended temperature ranges, significant energy savings are possible, he says.

Another possibility is building the entire data center without mechanical chillers. “This may be a good option for data centers able to operate at lower power densities,” Lawrence says. “Water cooling can be very efficient but is not cost-effective for data centers with average density requirements.” [P](#)

✔ *Tools To Use*

Whether you’re planning to build a new environmentally friendly data center or renovate the existing data center, Frost & Sullivan senior industry analyst Anu Elizabeth Cherian says a main point for companies to address is “efficiency and total PUE (power usage effectiveness) as a function of the backup power equipment installed in the system.”

Andy Lawrence, vice president of research for data center technologies at 451 Research, says ongoing and predictive monitoring is also essential for modern data centers. DCIM systems enable forecasting and capacity planning and ongoing management. CFD, meanwhile, is most valuable where designs aren’t proven or where heat flow presents particular challenges, he says.

✔ *Power Considerations*

Your choice of power is a major consideration in building an environmentally friendly data center. Info-Tech Research Group research analyst Jenna Maertz says location plays a big role when building an environmentally friendly operation. “Data centers located near natural sources of energy will want to build (or renovate an existing data center) so that it can take advantage of natural drilling, geothermal energy, or hydro-electric energy,” she says.

Along with that, Andy Lawrence, vice president of research for data center technologies at 451 Research, says although there are innovative methods for reducing power usage in the power chain, the benefits can be marginal and expensive. “Flywheels may be a good option in place of batteries, but the use of direct current, or fuel cells and other innovations, will likely be beyond smaller businesses,” he says. “Higher voltage distribution may also have some benefits, although this is mostly for larger data centers.”

BONUS TIPS:

✔ *Upgrade Your Servers*

Andy Lawrence, vice president of research for data center technologies at 451 Research, says one of the biggest ways to save energy in the data center is recycling servers every two to four years “so that the benefits of newer technologies and reduced power consumption are realized,” he says. Couple this with virtualization and consolidation so that super-efficient servers aren’t doing too little and consider low-energy servers but with performance implications examined carefully, he says.

✔ *Go Modular*

Info-Tech Research Group research analyst Jenna Maertz advises using a modular approach when designing a new data center. A large provider, for example, might build 30,000 square feet but only bring 10,000 square feet live at a time. “They can then easily expand it without taking the building down. In the interim, they just use temporary walls to control the cooling,” she says.

Organize & Clean

Keep Your Data Center Clear Of Messes, Obstructions & Other Issues

THERE’S PLENTY OF OPPORTUNITY for disorganization in a data center. After all, it can be a source of lots of activity, with equipment (and even people) regularly being added or moved.

Whether it’s something as simple as moving a few cables around for better management or something as complex as changing the entire layout of your data center, there are many ways to improve organization and prevent messes or potential outages related to an inefficient design. We’ll walk through a few examples designed to help you get your data center on the right track and prevent future organizational issues.

Develop A Master Floor Plan

The best place to get started with data center organization is to look at your

data center layout, discover potential issues, and then build a master floor plan that will clear up those issues. A master floor plan and the correct configuration of equipment, cooling systems, and other solutions will result in a nicer looking data center and leave enough room for employees to move around.

Improve Cable Routing & Management

Whether you’re trying to cleverly route cables from one end of the data center to another or simply trying to manage the patch cables used in and between racks, effective cable management is one way to avoid disorganization in the data center.

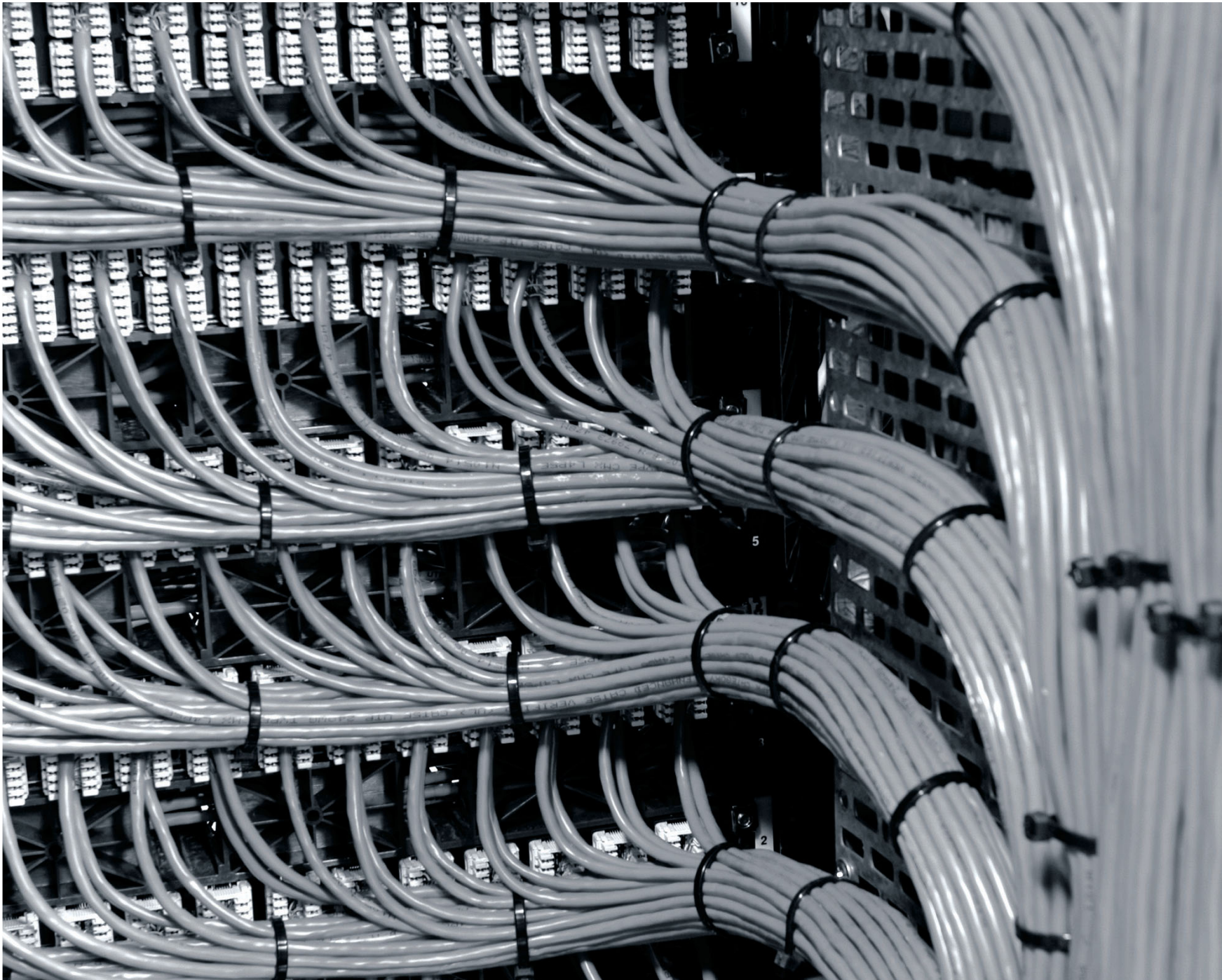
“When trying to organize a messy data center, the first step is to determine what

style cabling topology you have or desire and then select the appropriate equipment to support it,” says Laura Viars, senior sourcing specialist at Rackmount Solutions (800/352-6631; www.rackmountsolutions.net). For instance, Viars says that if you have a “distributed, in-cabinet switching topology” you will need to focus on “cable tray and exhaustive internal cable management for your switch cabinets.” The best approach depends on your specific layout and environment.

For some companies, physical cable management simply isn’t enough. This is a time where you may want to consider implementing new cable management practices or even software solutions that can aid in the cable routing process. Darin Stahl, lead research analyst at Info-Tech Research Group, says, “Even if I have as

Key Points

- Create a data center master floor plan that helps with the layout and configuration of your equipment. This can also help with other organizational issues such as cable management.
- Plan ahead during data center moves or layout changes to ensure that everything goes smoothly and you avoid the messes that often accompany large-scale redesigns.
- When your IT team makes changes to data center equipment, make sure they have adequate time to prepare and implement. Rushed installations can lead to disorganization in the data center layout and inside the racks.



little as 500 endpoints, I can look at cable and asset management software tools that are graphical and allow me to do labeling and track all of my changes.” There are many cable management solutions available, but some of them can be extraordinarily expensive, according to Stahl. He recommends doing your research and finding the solution that fits your network size.

Plan Ahead
During Moves & Redesigns

If you are updating the layout of your data center or moving from one location to another, make sure you put a well-formed plan in place.
There are few times when you get the chance to start from square one and

redesign a data center, so take advantage of it. This is an opportunity to learn from your current experience and decide if your current configuration is the best fit for your needs and employees. And it’s also an opportunity to look for possible organizational issues, head them off at the pass, and put your data center in a much better position for the future.
“Leave nothing up to chance,” Viars says. “Conduct extensive research or consult a data center planning professional if you are at all unsure of what will best suit your needs. If possible, plan for a redundant solution to keep your network running so that you aren’t tempted to rush a rebuild in order to

get back online more quickly. If you’ve done your homework and take your time, your move or redesign will go much more smoothly.”

Focus On Change Processes
To Prevent Future Messes

You can improve your overall data center organization by adjusting your business processes and how you handle implementations and changes. “We’ve actually seen a trend where [IT] teams, because they are so pushed to get things done and be agile, are actually shortcutting some steps,” Stahl says. “They’re just trying to shrink delivery times. But what happens when you start removing these steps in well-established change

processes is that over time it’ll tend to cause clutter and disorganization, which beyond just being messy, can lead to unplanned outages.”
To help avoid disorganization due to rushed implementation, Stahl says that companies should “commit or recommit to strict change policies” and focus heavily on the consequences from not giving your IT team enough time to make changes. He recommends companies track metrics and “use past and real experience” to make improvements in the change process. This will not only ensure that the job itself is done right, but also prevent inefficient equipment configurations, cable management mishaps, and other potential issues. ^P

Top Tips

Laura Viars, senior sourcing specialist at Rackmount Solutions (800/352-6631; www.rackmountsolutions.net), offers the following tips for improving the organization of your data center:

- ✓ **Research your topology.** You’ll want to make sure you are using one that works best for your needs. Don’t forget to factor scalability, manageability, and growth into your plan for reorganization.
- ✓ **Plan your new layout.** Even if you’re just reorganizing or modifying your layout, get a firm plan in place and procure the equipment needed to execute it.
- ✓ **Plan your time.** Determine the timeframe required to make the modifications—and be generous. Determine how much downtime you’ll have and prepare accordingly. The more planning you can do upfront, the better off your data center move or reorganization will be.

Action Plan

If you’re ready to get your data center organized and cleaned, follow these steps provided by Darin Stahl, lead research analyst at Info-Tech Research Group:

- Think about your racks, cabling, decommissioned devices that haven’t been removed from the racks, testing, and tools. Clean up those things and reorganize those racks. Also take the time to update the topology and rack diagrams.
- Focus on the patches and patch panels. These are quite often areas where infrastructure changes result in a mess as people are in a hurry.
- Move on to set up rooms and staging areas. A good spring cleaning here and there, reorganizing that space will ease all of your deployment activities. Get the boxes out, re-label, and get rid of the equipment you no longer need.
- Look at your utility spaces that really deal with the infrastructure facilities such as standby power rooms. The human traffic in that room isn’t always your staff. It’s often maintenance techs, who are usually pretty neat, but over time bits of wire or discarded work order forms start to pile up. It’s amazing what you’ll find in there.

Get Started

When you’re thinking about reorganizing your data center and planning for a potential new layout, it’s important to consider the human element. “You really want to step back and take into account all of the needs of your data center employees,” says Darin Stahl, lead research analyst at Info-Tech Research Group. “They’re going to be working in that room, and they need space to move around. They need space to access equipment and also a workplace to do staging and deployment.” Organization will not only make your data center look better, it can also help employees be more productive by creating a more natural flow throughout the space.



SIX QUICK TIPS

Enterprise Tablets: Major Issues To Consider

Data Center Managers Face Concerns About Security, Network Traffic & Bring Your Own Device

SIMILAR TO HOW smartphones started infiltrating office environments years ago, tablets are increasingly showing up in enterprises. And while these devices can provide considerable functionality and help improve productivity, they can also introduce unforeseen problems to a company and its resources. When looking to implement tablets in your company or trying to find ways to support an existing influx, here are the issues you need to be aware of to make sure you are fully prepared.

✓ *The Right Tablet For Your Environment*

As tablets continue to get more similar in terms of features and functionality, it may seem like any tablet will

work for your employees. But the truth is that even though manufacturers are closing the gap on each other, there are still quite a few things to consider when comparing tablets. For instance, if users are going to be consuming considerable content, it may be helpful to invest in tablets with larger screens. If employees will be using tablets to create content, a keyboard attachment can make productivity faster and easier. But you also may need something that is flexible enough for both uses, so you don't end up with a device-segmented workplace.

"Hybrid tablet/laptops have been attempted over the years but always end up bringing the worst of both worlds," says Michael Battista, Ph.D., a research

analyst at Info-Tech Research Group. "There is more potential in a modular approach; for example, I have a case on my iPad that is also a keyboard. In most situations, it can do anything a laptop could, but I can also take it out and use it as a standalone tablet."

✓ *Consider The Inherent Security Risks*

As with any device, there are security risks specifically associated with tablets. "Tablets are small, so they tend to be brought everywhere and often left lying around," Battista says. "If the device didn't have a passcode to unlock it, that could mean super-secret company data gets out there for anybody to take a peek

at." Battista adds that tablets are also seen as being less manageable than traditional computers because they are based on operating systems that "weren't designed with businesses in mind." This leads to many IT departments not having the expertise or experience to tightly control tablets.

As for the security risks, companies simply need to make sure employees are always aware of their tablets and understand that they can be a key for any thief to unlock sensitive company information. Battista recommends companies make it policy to put passcodes on tablets and also make it so tablets can be remotely wiped if lost or stolen. He also adds that to help improve manageability, companies can invest in mobile device management suites





that, “through a combination of back-end infrastructure and on-tablet agents, can bring tablets to a manageability level approaching what companies have gotten used to with Windows-based PCs.”

✓ *Be Ready For BYOD*

Because tablets started out primarily as consumer devices, it’s safe to assume that employees will end up bringing their own mobile devices to the workplace. Although they may also use them for personal use, there is the potential that they may want to perform work tasks with them, too. In a recent Forrester report “Prepare For Anywhere, Anytime, Any-Device Engagement With A Stateless Mobile Architecture,” vice president and principal

analyst Chenxi Wang, Ph.D., writes that “unmanaged devices are a fact of life” and “gone are the days when IT can demand to manage devices on the corporate network and rely on being heard.”

Still, companies aren’t completely left in the dark when it comes to BYOD. It’s simply a matter of learning “to incorporate unmanaged user devices as part of their ongoing business strategy,” Wang writes. One course of action is to implement policies for when it is appropriate to use consumer-owned devices in the workplace. It’s also possible to set up VPNs so users don’t actually save any sensitive content on the devices themselves but can still access them to complete tasks. It’s nearly impossible to prevent employees

from bringing their own devices to the workplace, so it’s important to be flexible without leaving yourself vulnerable to security threats or a networking burden, the report notes.

✓ *Can Your Network Handle The Traffic?*

Whether your company decides to issue tablets to the workforce or you support a BYOD policy, the increased traffic could have a dramatic effect on your network. Most companies “did not account for the increased traffic demands of an empowered workforce” early on and are now suffering, to a degree, because of it, Wang writes. As an example, Wang points out that AT&T actually saw a 5,000% increase

in traffic from 2007 to 2010, which led to slower speeds and spotty connections during that time.

Data centers can use this as a cautionary tale when it comes to bringing enterprise tablets into the workplace or letting employees bring in their own devices. If your wireless network isn’t ready ahead of time, you could incur bottlenecks that not only harm the connection speeds of tablets, but also every other device in your company. You should consider how many devices will connect to your network at any time and how much of your networking resources they will use. Then plan accordingly to avoid overly taxing your network and possibly incurring downtime.

✓ *Assess The Need For Tablets*

Before you even start looking at which tablets to purchase, make sure that your workforce will actually use them. Letting employees bring in their own devices is one thing, but choosing to issue tablets or fully support them should be a needs-based decision.

“Most companies should be preparing for an increasingly mobile world regardless, but if they are officially supplying or supporting tablets, make sure there is an actual use case for it,” says Michael Battista, Ph.D., a research analyst at Info-Tech Research Group. “Tablets are increasingly ready for real work, but only certain kinds of work. Don’t jump on the bandwagon just because it’s what the cool kids are doing, but also don’t resist change if it has a purpose.”

✓ *Build A Mobility Team*

Chenxi Wang, Ph.D., vice president and principal analyst at Forrester Research, writes in her report “Prepare For Anywhere, Anytime, Any-Device Engagement With A Stateless Mobile Architecture” that companies should “put together a mobility council” that consists of “representatives from app [development], networking, client management, security, and business.” This team will be able to assess the company’s needs and find ways to meet them.

“Because most likely there is not a solution out there that will provide everything that you want, the mobile team will have to craft compensating controls, deliver stop-gap measures wherever necessary, and work with the rest of the IT to ensure the success of mobile delivery out of the mobile chaos,” Wang writes.

BONUS TIPS:

✓ *Don’t Sweat The Specs*

“It’s not about specs anymore,” says Michael Battista, Ph.D., a research analyst at Info-Tech Research Group. “Any two tablets can have exactly the same specs but widely different user experiences and capabilities.” Instead of getting held up on specs, companies should instead look at operating systems and form factors (or screen size).

✓ *Aim For Company-Wide Compatibility*

If you can supply the same tablet to every user, it will help your IT team be able to secure and manage the devices and easily make updates or wholesale changes if necessary.

Evaluate & Implement Solid State Drives

How To Decide If SSDs Are A Fit For Your Data Center

A CONSIDERABLE AMOUNT of promise and upside has been attached to SSDs over the years. The recent releases of enterprise-class SSD models from multiple manufacturers have only fueled the excitement. So, is 2013 the year that SSDs see widespread use in the data center, and if so, how should a small or mid-sized enterprise go about evaluating if implementation makes sense? Here is what industry insiders are saying.

✓ *Get Up To Speed*

It's debatable whether 2013 really will be the year SSDs break into the data center in a big way. Greg Schulz, senior advisor at Server and StorageIO Group, points out that the same prediction was made in 2010, 2011, and 2012. A more likely scenario

is that 2013 will see continued ramping up, adoption, and deployment of SSDs, he says, though "widespread customer deployment will still be a few years out."

Mark Peters, senior analyst at Enterprise Strategy Group, says while there's no real sign SSDs (he prefers "solid-state storage" to allow for various form factors and placements) will overtake HDDs from a capacity perspective any time soon, solid-state storage is becoming more widespread where its involvement in active IO is concerned, whether as actual persistent storage or via a caching or tiering model. "I suspect that will only increase so as to be dominant real soon," he says. Solid-state is also becoming more widespread in new system sales and upgrades, he says.

Trenton Baker, vice president of business development at DataON Storage (877/512-0432; www.dataonstorage.com), says "adoption is speeding along" but that complete widespread adoption "may not reach full potential as predicted." Baker says his company's clients are showing increased interest where SSDs relate to requesting storage arrays. As the market matures, he says, "there are certainly pressures to adopt to the performance benefits of SSD."

✓ *Recognize The Concerns*

Cost is arguably the biggest concern regarding enterprise SSD adoption. But Peters says in many cases this shows a lack of understanding about the judicious use of small amounts of solid-state storage and the true cost of HDD

storage. Schulz says other concerns include lack of confidence and capacity in the technology, concern over vendor and product stability, endurance and durability, and "what to use when, where, why, and with what."

Baker says he sees the most common concern regarding SSDs as "the clutter of various drives out there that confuse the market with claims of enterprise quality," something that can be pinpointed to the fundamental differences between SATA drives and SAS drives.

"You will never have a true enterprise SSD solution with SATA drives," he says. "Yes, it's great that they cost less, but they are an inherently inferior technology. SAS drives provide multi-path unlike SATA, and this feature is crucial to deliver high-availability and clustering."



✓ *Weigh The Pros & Cons*

Benefits of SSDs generally include speed, enterprise-grade endurance, environmental advantages (power, noise, space), productivity boosts (including application performance), and reliability. Baker says top-tier SAS SSDs deliver consistent performance with generally only about 5% degradation over the life of the drive compared to the common losses of more than 25% seen in consumer-grade drives.

Peters says a less obvious benefit is the potential for SSDs to drive down the overall cost of storage. Using SSDs to handle high IO intensity, for example, can improve the utilization of regular disk

drives that “otherwise were purchased and deliberately short-stroked,” and enable you to put remaining capacity storage on larger, slower, cheaper-per-GB HDDs. SSDs can also benefit environments that are consolidating services or desktops or performing a lot of writes or updates.

Baker says CAPEX is the first downside of SSDs, though “once that hurdle is justified with the performance ROI, the only other downside is choosing the wrong type of drive.” He cautions staying clear of low-cost, consumer-class SSDs, including SATA SSDs that claim enterprise-grade capability but “must use an interpose to ‘appear’ as a SAS device. These interposers are a common point of failure and simply not enterprise-grade.”


✓ *Buying & Implementing*

Schulz says nearly any application with high performance requirements or impact can benefit from SSDs. This includes databases, email, file sharing, transaction or redo logs, and other active applications that perform a lot of reads or writes. Other areas that can benefit include VDI and server virtualization, big data, search and indexing, video and audio editing, and Web and cloud services.

When considering SSDs, Schulz says to focus on solutions and providers that can fit into, co-exist, and complement the current environment and are easy to acquire, install, use, and manage. “Look for solutions that either have tools or work with existing tools that you might already have for management;

performance; and activity monitoring, alerts, and notifications. Also seek solutions with resiliency in terms of redundant components, RAID, replication, and snapshots, he says.

Baker says when deploying SSDs, account for CAPEX expenditures and set performance and ROI expectations. If the SSD array is architected effectively and efficiently, you will see performance benefits and enterprise-grade endurance, he says.

Numerous software-defined storage providers have tailored software solutions to maximize SSDs’ benefits. These advancements, he says, “present improvements in their own way, so it’s important to discuss your potential deployment with a storage architect as opposed to simply using an online configurator and placing an order.” 

✓ *One Size Doesn’t Fit All*

Based on the potential benefits available, some companies will determine that acquiring SSDs and implementing associated processes for them is worth investing the resources. But Trenton Baker, vice president of business development at DataON Storage (877/512-0432; www.dataonstorage.com), says you shouldn’t fall victim to the assumption that designing a storage solution is a one-size-fits-all paradigm. Key to designing a solution, he says, is finding a storage architect that can provide an engineer-to-engineer approach and has the experience to discover, develop, and evaluate a proof-of-concept SSD deployment.

✓ *Look Beyond The Data Center*

Greg Schulz, senior advisor at Server and StorageIO Group, says implementing SSDs can benefit a company in other areas beyond the data center. Even using SSDs in workstations and notebooks, for example, can provide a company worthwhile benefits that can pay off in the long-term.

Advantages from using SSDs in workstations and notebooks can include saving numerous minutes a day per user in terms of the time the user waits for files to save, programs to load, and other tasks to complete. Factor the couple of minutes saved a day per user (which is a conservative estimate, Schulz says) out across a year, he says, and the savings “can start to add up quickly in terms of benefit.” Overall, Schulz says to “keep in mind that a little bit of SSD in the right location can go a long way.”

BONUS TIPS:

✓ *Be 100% Clear*

When acquiring SSD storage, Enterprise Strategy Group senior analyst Mark Peters recommends working with someone with “modeling ability to both figure what you might need and tell you the impact X or Y amount of various types of solid-state would have. Be 100% clear on what you’re trying to achieve, so as to avoid ‘bright shiny object syndrome.’”

✓ *Don’t Buy Too Much*

Greg Schulz, senior advisor at Server and StorageIO Group, says buying too much SSD storage and using it in the wrong places can result in “excess budget consumption while under-delivering.” On the other hand, not buying the right solution for a particular need is another potential pitfall. “Know your options and know your problem, challenges, and opportunities, along with needs and wants, and then do some smart shopping,” he says.

SIX QUICK TIPS

A Look Inside Green Grid Metrics

Use The Measurements To Improve Efficiency & Minimize Environmental Impact

THE GREEN GRID is known for providing helpful metrics that center around improving the overall efficiency of data center facilities. Some common examples are power usage effectiveness (PUE) and water usage effectiveness (WUE), which are becoming more popular with data centers. But from The Green Grid’s perspective, companies shouldn’t stop with these two metrics and call it good, because there’s so much more that can be done.

“What The Green Grid is doing now is trying to get one step away from just energy and saying, ‘If you solve the efficiency equation for energy in your data center, why not focus on other things as well?’” says David Cappuccio, vice president and chief of research at Gartner. The Green Grid

has created new metrics and put a stronger focus on existing ones to help companies strive for the highest possible efficiency.

✓ *Green Energy Coefficient*

One of the simplest, but most important metrics The Green Grid offers is the green energy coefficient (GEC), which is “a percentage of energy coming into the facility that is green,” says Harry Handlin, vice chairman of The Green Grid’s technical committee. There are multiple examples of situations that GEC will take into consideration, including “onsite renewables, contracts for renewable power that you have with a utility company, or a contract that you have with a wind farm,” Handlin says. The goal of GEC is to give you a

solid figure for how much green energy you are actually using. This is a great metric for those looking to see how efficient their existing green tech implementations are and for companies that are just starting off and want to find ways to do even more.

✓ *Energy Reuse Factor*

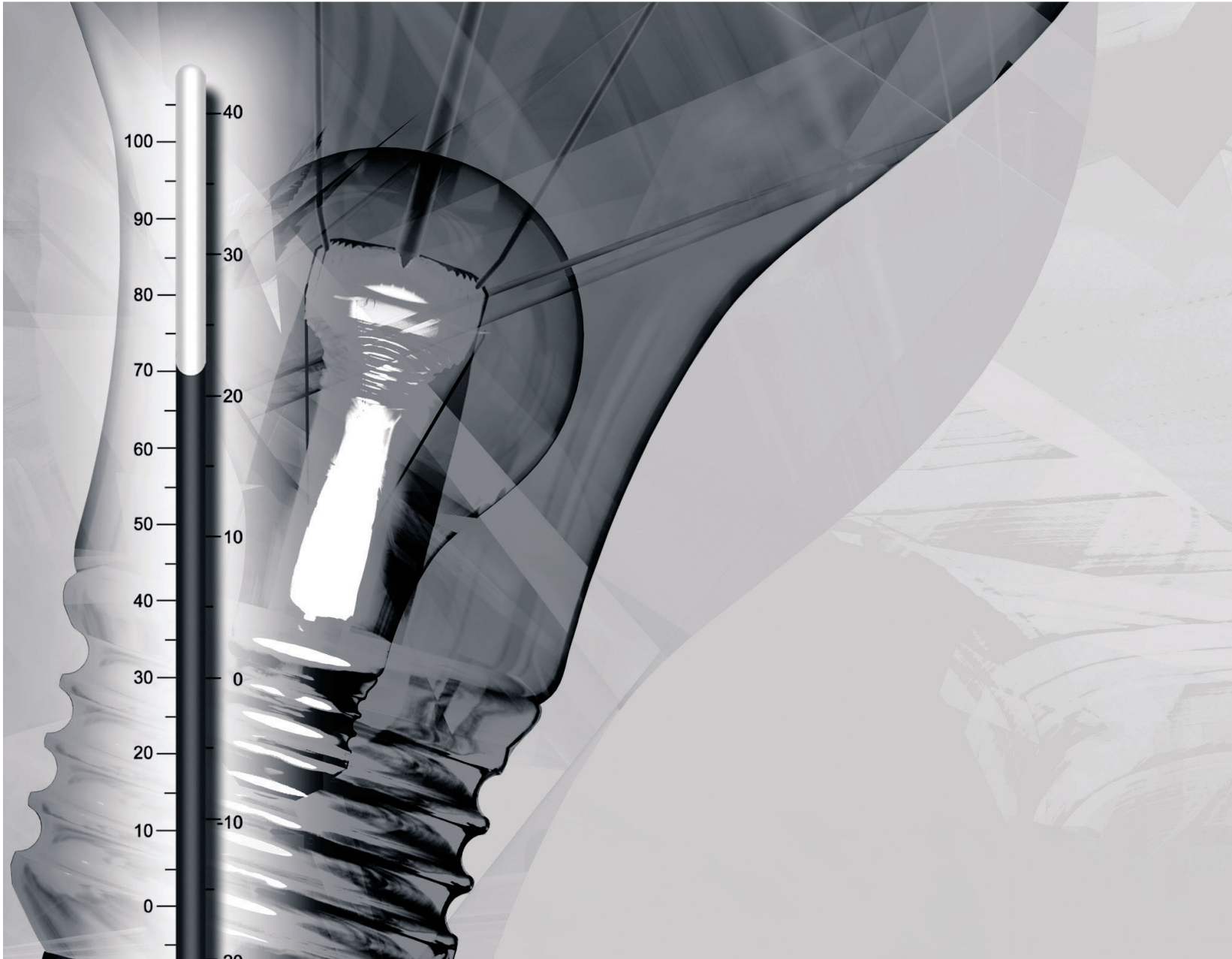
Energy reuse factor (ERF) is meant for organizations that generate their own power onsite and have excess energy the data center doesn’t utilize. “The energy reuse factor is a metric that defines the portion of energy that’s exported for reuse outside of the data center,” Handlin says. “For instance, if you have a data center that’s generating its own power, and in some parts of the world they will have natural gas generators, and if you can recover some of

that heat and sell it to an adjacent facility, that energy is actually reused.”

ERF isn’t a fit for all companies, as some smaller organizations simply don’t have the resources to generate their own power. But Handlin says the technology should continue to improve and more companies will be able to implement solutions that recover waste energy, which can then be sold to other facilities or simply used in a more efficient manner. “What do you do rather than just dissipate heat into the atmosphere and reuse it?,” Handlin asks. “That’s going to be a bigger and bigger topic as we get more mature in our industry.”

✓ *Carbon Usage Effectiveness*

Carbon usage effectiveness (CUE) is similar to PUE and WUE in that it gives



the owner an “assessment of the total greenhouse gas emissions of the data center relative to the IT energy consumption,” Handlin says. This metric is considered absolutely crucial in Europe, Asia, and Australia, where many companies are heavily regulated to minimize their carbon footprints. Because the United States lags when it comes to carbon-based issues, The Green Grid is putting a stronger focus on CUE and trying to help companies understand its importance.

Handlin says companies can better implement CUE-based initiatives by integrating them with existing performance metrics. “We know of several data centers that use PUE as a metric, and their data center operator is charged with improving

his PUE by a certain amount year over year, and that’s just part of his job,” he says. “We’d love to see that same type of thought process applied to these metrics. A data center operator has to take certain actions, and if one of his goals and objectives as far as his performance metric is to reduce his carbon footprint, CUE would be a great tool for him to benchmark where he is and how his data center is improving over time.”

Some companies are tied to their carbon usage based on their geographic region, and businesses in some areas are “blocked in by local regulations and have to secure power from a local facility,” some of which are coal fire plants, Handlin says. For those companies, Handlin says they

simply need to do their best and determine whether they can contract for renewable green energy sources with local providers to supplement at least a portion of their energy.

✓ *Additional Green Grid Resources*

The Green Grid provides quite a few metrics for companies to take advantage of, and there is already proof that these measurements are truly beneficial for data centers in any industry. PUE is helping companies understand how they use the energy they bring into their data centers and ways to improve the efficiency. WUE is helping companies find “different ways to cool equipment without wasting all that

water,” Gartner’s Cappuccio says, adding that the figure can be “literally hundreds of millions of gallons a year for a good-sized data center.”

But The Green Grid doesn’t begin and end with metrics and measurements. The group also aims to educate companies on what changes they can make to help them save money, but also minimize their impact on the environment around us. “We try to give more information, metrics, and tools from The Green Grid website for things that can be done to improve the efficiency and environmental sustainability, and these metrics are just another example,” Handlin says. “We’ll continue to work on these, and hopefully we’ll have more in the future” [P](#)

✓ *Follow The Data Center Maturity Model*

One of the only ways to determine whether your data center is correctly using The Green Grid metrics is to compare yourself against other companies and consider your place in the data center maturity model. “It’s an important tool for a data center owner or operator to establish a benchmark for where his data center is relative to the industry best practices today and also creating a road map going to the future,” says Harry Handlin, vice chairman of The Green Grid’s technical committee. “It does a great job of looking at all aspects of your data center, not only from a facilities standpoint, but also from an IT standpoint. It really does a good job of benchmarking where you are and is a good tool to look at a long-term plan for improving the efficiency and sustainability.”

✓ *Focus On Localized Benefits*

According to David Cappuccio, vice president and chief of research at Gartner, countries in Europe or Asia can look at something like carbon usage effectiveness (CUE) and “calculate the potential tax in their head.” Because they are more regulated in that sense than the United States, they are more likely to cut down on emissions.

With North American companies, Cappuccio takes a different approach and focuses on benefits that better fit the North American mindset. “What I’m talking to North American customers about is, if you focus on energy consumption and energy savings, what you’re doing is reducing operating costs,” Cappuccio says. “And the secondary benefit is that you’re also improving social responsibility [and] carbon footprints, and it’s good for everybody. It’s a win-win. That argument seems to be taking hold in North America. A lot of folks are realizing that by doing some simple things, they can actually improve those indexes, reduce costs, and make IT itself a more efficient organization.”

BONUS TIPS:

✓ *Be More Aware Of Physical Space*

If you want to improve your data center’s efficiency and hit the optimal targets of The Green Grid’s metrics, then you should “focus on space efficiency, not only energy,” says David Cappuccio, vice president and chief of research at Gartner. “How do I get more compute capability out of my existing footprint rather than building ever larger and larger data centers?” If you can answer that question, you may see your overall efficiency improve significantly.

✓ *Consider Alternative Cooling Methods*

Cappuccio says one way to improve your PUE is to consider liquid-based cooling. “Water is 1,600 times more efficient at cooling than air is,” he says. “It’s more expensive to implement, but there are long-term significant savings.” Most companies use a refrigerant instead of water, so you can also improve your WUE at the same time.

Plan For A Network Expansion Or Upgrade

Due Diligence, Flexibility & Knowledge Of Emerging Technologies Are Crucial

EXPANDING OR UPGRADING YOUR network can be a daunting task, especially without proper planning. Among other tasks, you need to upgrade in waves in order to prevent downtime, have a solid backup plan if things go wrong, and make sure your newly implemented solutions give you the performance and efficiency they promise.

When it comes to a network expansion, there's no such thing as too much planning, and it all starts with establishing a baseline so you know where you are and where you want to be in the future.

✓ **Monitor & Preplan**

Gaining in-depth visibility into your network is fundamental to any successful network expansion. "The first thing any

organization with an enterprise network should be doing is monitoring their network," says Mark Tauschek, lead research analyst at Info-Tech Research Group. But to get the most benefit, you need to go beyond seeing what's happening on your network and actually use this data to make a difference or spot where the true problems exist.

For instance, without a monitoring system, you might hear that employees are having difficulty using the network or they're complaining about speed, so you decide to add capacity without any further research. But with a network monitoring system in place, you might see that you have a lot of "bad traffic," such as video streaming sites or peer-to-peer networking, burdening your network, Tauschek says. If that's the case, you actually

need to reprioritize your traffic rather than upgrade your infrastructure.

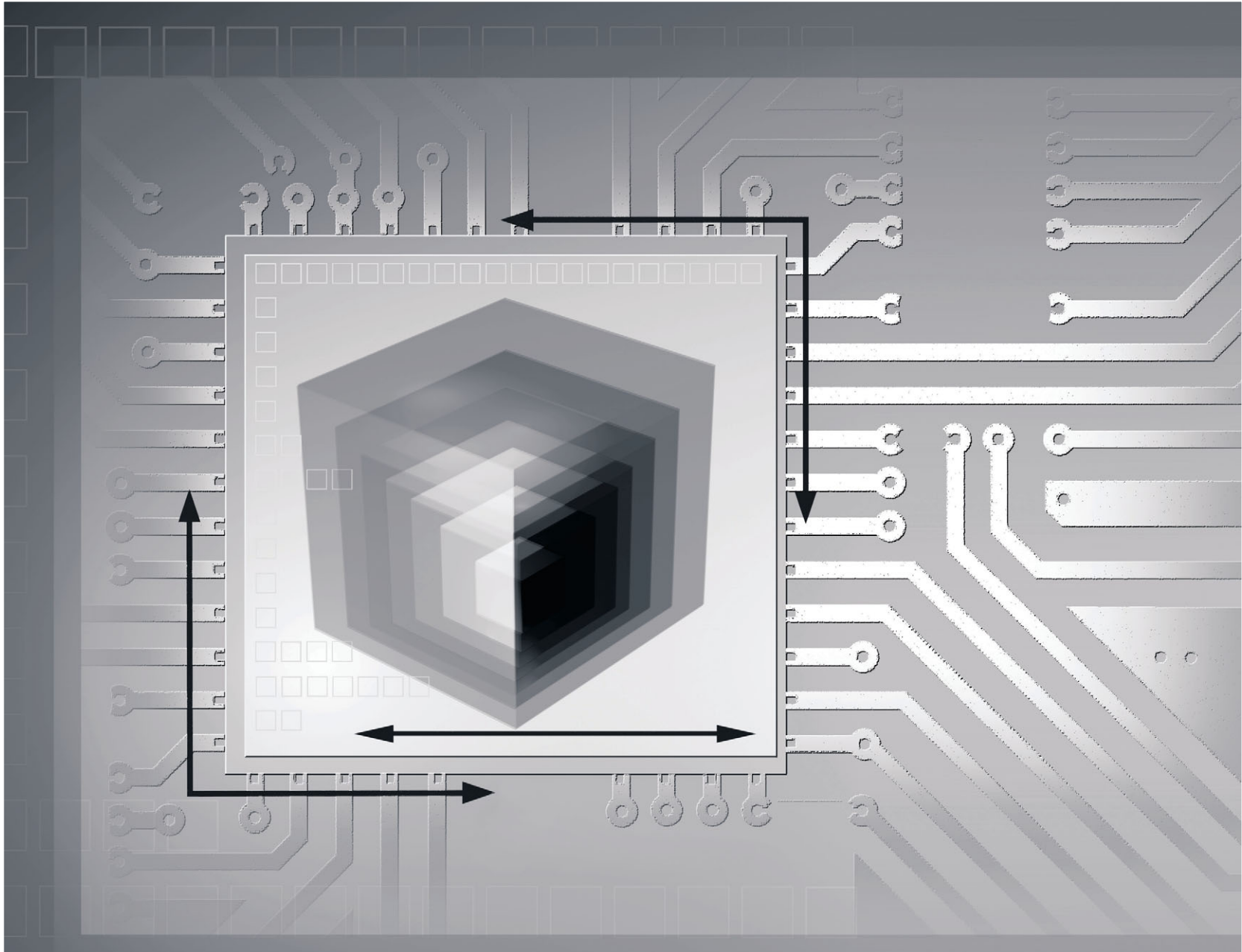
If you find an upgrade is necessary, you can use monitoring solutions as planning tools. "There's obviously a significant planning element here," Tauschek says. "If you're going through a significant network expansion, it's important to take the time to plan out, based on historical network traffic growth, what you're going to need to expand to and where you're going to need to expand."

✓ **Network Flexibility Is More Important Than Ever**

With so many new technologies released and consumers bringing their own devices into the workplace, you have to make sure your network is capable of keeping up

with the demand. It's not enough to have a network that can handle one aspect of business, because you may be neglecting another. And you also need to be prepared for changes that may occur in the future. When upgrading or expanding your network, you need to not only take care of your current issues but make sure your infrastructure is flexible enough to meet long-term performance standards.

"The network touches everything: users, applications, and devices," says Andre Kindness, principal analyst at Forrester Research. "You have to think about it from more than just hardware flexibility, but overall solution flexibility and how well it integrates with other systems out there. There are always going to be new systems coming





online, so do you have interfaces that are standardized and let you interface with other ones? You have to think about it in the biggest system business sense as well.”

✓ *Focus On Wireless*

With the advent of super-powered laptops, tablets, and smartphones, the business world has become more mobile-oriented. To help keep up with this boom in mobile usage, wireless service providers have come out with faster network speeds and more reliable performance. But as these devices start to make their way into the office and into the hands of customers, you need to expand your wireless network to support the incoming traffic.

This also has a profound effect on wired networks, which are typically much more

difficult and expensive to expand due to the infrastructure requirements. However, for the most part, companies should put a strong focus on wireless network expansion to keep up with employee and customer needs.

“For the end user, I’m going to be moving more to wireless,” Tauschek says. “In a wireless network, it’s much easier to expand to meet capacity, and it’s really the way we’re going. . . . You may hit walls where you have to do some step upgrades in terms of the controller hardware, software, and licensing, but it’s just a much easier expansion path than it is on the wired side.”

✓ *Hold Out For SDN*

Software-defined networking (SDN) is a hot topic in the data center world. SDN

solutions are starting to emerge, and many companies now have the option of putting pilots in place to test the technology and learn how to use it effectively.

If you’re looking to expand your network to meet the growing demands of your workforce and customer base, SDN is something that you’ll want to pay attention to. Otherwise, you may find yourself spending too much money on extending the life of your existing infrastructure.

The benefits of SDN are well-documented, with the biggest advantage being the separation of the control and access layers. Not only do you have better visibility into your network with an SDN implementation, but you can also make policy changes or even scale out your

network essentially on-the-fly. Most wireless networks have multiple access points, each with its own controls, which makes it difficult and costly to make upgrades.

If you can hold off until SDN becomes a major mainstream technology, you can save yourself from headaches and overspending.

“If you really need to expand your network, at this point in time, my advice to clients would be to do what you can to get you by for the next year or so,” Tauschek says. “Right now, we’re just starting to see SDN gain some traction on the vendor side. We think that 2014 is going really be the year that it takes off. Go forward probably a year out from now, and expansion will almost certainly include an SDN element.” ^P

✓ *Compare Features, Not Brand Names*

The days of one-size-fits-most solutions are gone, for the most part, which means that you can now seek out networking technologies and applications that fit your specific industry. Rather than going for the most popular brand, you can dig deep and research all available options to not just pick a solution that is close to what you need, but find one that fulfills all of your business and industry requirements.

“We’re seeing a shift away from best-of-breed solutions to finding the solution that fits the business the best,” says Andre Kindness, principal analyst at Forrester Research. “Hotels need a lot of guest access, but in a manufacturing plant, you don’t need that same guest access. You’re starting to see a fragmentation of vendors out there doing certain things.”

✓ *IT Communication Is Key*

Keep in mind that no two networks are 100% alike and that a “network that supports one company will be totally different than a network that supports the needs of another,” says Andre Kindness, principal analyst at Forrester Research. Your IT department and, more specifically, networking team, needs to go out into the company and determine what the true needs of employees are, rather than assuming their upgrades will yield the necessary results.

“There are a lot of solutions out there that do a better job in certain areas than others,” Kindness says. “The first step is going out and having that conversation to make sure that how you’re going to expand is in alignment with where the business wants to go, and then you can find solutions that will fit that type of environment.”

BONUS TIPS:

✓ *Listen To Feedback*

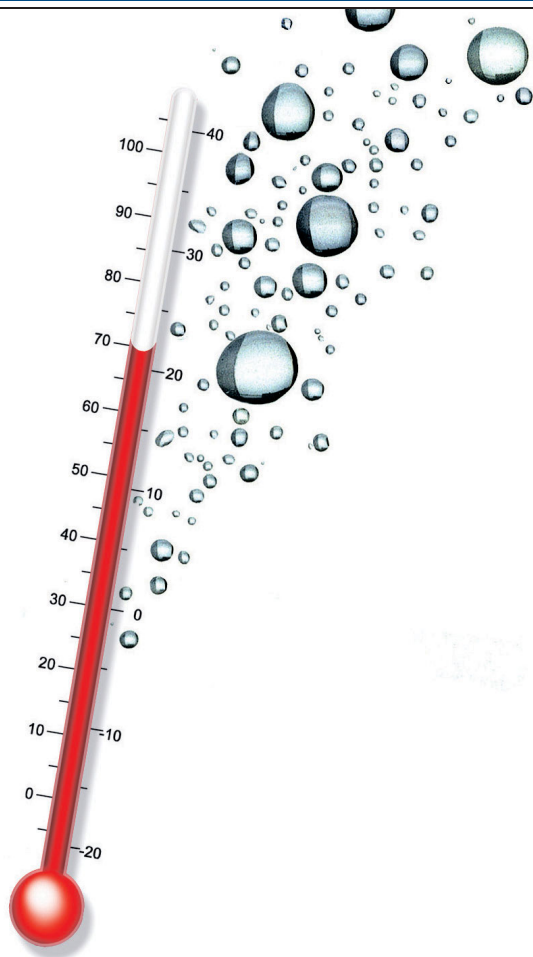
“If the personnel, customers, and users of the network are complaining, it causes costs or potential loss of revenue,” says Andre Kindness, principal analyst at Forrester Research. “It can be a big change for a lot of companies out there, and if they can’t get their products out because people can’t use the network, then that’s the biggest issue.”

✓ *Complexity Breeds Complexity*

Before you start expanding your network, you need to understand what types of technologies you want to implement, such as virtualization. You need to be well prepared and know what to expect because the “complexity of the network is really the key indicator of how difficult it will be or what’s going to be involved in entering into network expansion,” says Mark Tauschek, lead research analyst at Info-Tech Research Group.

BUYING TIPS:

Environmental Monitoring Equipment



ENVIRONMENTAL MONITORING offerings are not things an enterprise invests in on a whim. Every organization has unique infrastructure limitations, climate issues, and monitoring needs, so there’s no one-size-fits-all solution. Here’s what to look for.

✓ *Define Your Needs & Threats*

Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says you need to know what types of threats might occur. “The most common environmental risk is excessive heat within the cabinets, so you’ll definitely want to make sure you are monitoring temperature,” she says. Other potential environmental dangers include power surges/loss of power, humidity, smoke, airflow, and room/cabinet entry.

“Know thy facility,” says Michael Sigourney, senior product specialist at AVTECH (888/220-6700; www.avtech.com). “The first thing an IT or facilities manager needs to consider and create is an understanding of the basic layout and elements, both structure and equipment, within their facility. Knowing where threats are likely to occur or have occurred in the past is key to planning success.”

Water and leak detection can be easy to neglect. Chris Pullen, president of RLE Technologies (800/518-1519; www.rletech.com), says that, while power failure is the No. 1 cause of downtime, water is the second and can often be the overall cause of a power failure. He says you need to install leak detection throughout your facility. “Don’t forget to look above the ceiling. What’s on the floors above your data center? Look outside the box.”

✓ *Understand The Options*

With so many choices, it’s tough to know where to start. Harry Schechter, founder and CEO of Temperature@lert (866/524-3540; www.temperaturealert.com), says ease of use and reliability are the two most important features to look for. “Choose a product that provides just the features you need, and this will ensure you’re getting something that will be intuitive to set up,” he says.

When it comes to connecting monitoring equipment to the network so that it can send alerts, several options exist, Schechter says. USB, Wi-Fi, and Ethernet remain popular, but there are also newer infrastructure-independent devices based on cellular phone connections.

✓ *Install & Monitor*

An environmental monitoring system is nothing without notifications. “The primary

motivation for adding an environmental monitoring system is to know when you have a problem as soon as possible,” says Bob Douglass, vice president of sales and marketing at Sensaphone (877/373-2700; www.sensaphone.com). Common notification options include email, LEDs, audible alarms, beacons, sirens, Web alerts, SNMP, automated phone calls, and SMS.

To avoid false alarms, let the monitor run for a few hours after installation so you can see the natural cycle of temperature and other sensors, Schechter says. Once you have a chance to review what a “normal” reading looks like, you can set an appropriate high/low threshold.

✓ *Ensure Ample Coverage*

Consider the room size and amount of equipment to be monitored and plan the number and placement of sensors accordingly. “If your deployment is small, a few points of measurement may suffice, but if you have a large operation, you may require environmental measurements every few feet,” says

Brandon Siri, senior marketing representative at Server Technology (800/835-1515; www.servertech.com).

✓ *Get All You Need*

Be sure you get all the components to complete the system, Viars says. “Most systems have a main console, and in addition to that, you’ll need to purchase various sensors based on what you are looking to monitor specifically.” Some sensors might require a power source, so consider that when planning your layout.

Sigourney adds that the best solutions include software. “This prevents wasted time trying to get hardware and software from two vendors working together.”

✓ *Consider Long-Term Support*

Choosing the right solution means little if you don’t have long-term support, Sigourney says. “Look beyond the checklist and make sure that you’re getting future enhancements, that you have access to support, and that the company stands behind its products.”

BUYERS’ CHECKLIST

- ✓ Do you need to monitor remote or local systems?
- ✓ Do you have wired networking or power limitations?
- ✓ What kinds of notifications do you need?
- ✓ Do you have other monitoring needs beyond environmental?
- ✓ How many and what types of sensors do you need?

KEY TERMS

dry contact

Refers to an electrical contact that has no internally available voltage.

server environmental monitoring system (SEMS)

Records and reports the environmental conditions of servers and clients.

Simple Network Management Protocol (SNMP)

A network protocol that lets users monitor network availability and performance in addition to a variety of other devices such as power and cooling systems.

BUYING TIPS: Security

WITH SO MANY SECURITY solutions on the market, it can be difficult to choose the right ones. Here is some advice on what every enterprise needs.

✓ Start With Network Access Control

A network access control solution will limit unnecessary access to your company’s internal resources. If you can prevent outsiders from connecting to your network, then there is a much smaller chance of a security breach. Network access control systems can also be used to monitor the mobile device connections of employees working outside the company. Smartphones and tablets are becoming popular targets for hackers, so checking to make sure the external connection is safe and secure will go a long way toward preventing a potential intrusion.

✓ Move Up To Unified Threat Management

A UTM solution goes a bit beyond network access control by essentially creating a gateway through which all users and data has to pass before it lands on your company’s internal infrastructure. UTM combines intrusion prevention, antivirus, antispam, and many other features into one solution designed to protect your company.

✓ Don’t Forget Email Security

Receiving malware-filled messages can result in the infection of one computer or the infrastructure of the entire company. And sending messages with sensitive information no matter what the reason is always a dangerous proposition. As one of the most basic measures, every company should have some form of encryption attached to its email systems. Encryption helps ensure that even if an email is intercepted, it is less likely that a hacker will be able to mine anything from it.

Along with encryption, you’ll want to invest in an antivirus program to protect servers and endpoints against malicious code and viruses. Make sure the program you purchase automatically downloads and deploys signature files all the way to the endpoints.

✓ Add In Data Loss Protection

An enterprise DLP (data loss prevention) solution can “offer a lot of capability in terms of preventing the egress of data,” says James Quin, lead analyst at Info-Tech Research Group. Such solutions can be expensive, so finding existing tools with DLP capabilities (up-to-date network perimeter UTMs and comprehensive endpoint anti-malware packages) can “deliver


at least a moderate level of protection without the excessive cost,” he says.

✓ Check For Updates & Upgrades

Making certain basic security tools are in place is half the battle. The other half is ensuring antivirus systems, hardware, and anything else tied to security are continually patched and updated.

Dan Olds, founder of Gabriel Consulting Group, says IT should take a “maniacal” approach toward patching software and firmware. “Unpatched and unmaintained systems are the biggest cause of security vulnerabilities,” he says. “The biggest trouble areas are

systems on the network that haven’t been maintained and patched to the appropriate levels. There are a wide range of devices that tend to fly under the radar, including servers, desktops/laptops, and networking components. If something is on the network and can see the outside world, it can end up being a vulnerable point that can be exploited.”

One possibility, Olds says, is using a network discovery tool that tracks down everything on the network and creates an inventory of items that need to be checked and that need the latest patches. “This is a good project for a new hire or intern—provided they’re supervised,” he says. 



BUYERS’ CHECKLIST

- ✓ Does the solution allow you to limit access to the network and block unwanted connections?
- ✓ Can the solution provide a perimeter defense that prevents threats from landing on your servers and other internal equipment?
- ✓ Emails make it easy to infect computers with viruses and send out sensitive data to hackers, so you should invest in a strong email encryption solution.
- ✓ Will the vendor help you set up an update and upgrade plan that will let you keep your security solutions up to date without breaking your budget?

KEY TERMS

mail transfer agent (MTA)

A solution that catches and checks incoming email for threats before transferring it to your internal email platform.

network access control

A solution that helps you limit access to your network and lower the chance of an infiltration.

unified threat management (UTM)

Software (often installed on a managed appliance) that seeks to comprehensively block malware and network threats through features such as a firewall, antivirus, antispam, intrusion prevention, VPN, access policy enforcement, and more.

BUYING TIPS:

Data Center Cleaning Services



A CLEAN DATA CENTER IS CRUCIAL to the performance of your physical infrastructure and the productivity of your workforce, but you can't rely solely on your janitorial staff to get the job done. Here's what to look for when hiring a data center cleaning service.

✓ *Check A Service Provider's Experience & Reputation*

It's important that you don't rush in to choosing a data center cleaning service, because there are multiple factors to consider that may make one firm fit your needs better than another. Not every data center is created equal, and many data centers have unique cleaning needs that not all cleaning services can address.

You should research what cleaning firms offer and also look at their reputation and guarantees. You must make sure the provider has years of training in cleaning data center environments, including floors, ceilings, cases, internal components, and much more. In addition, cleaning companies should follow ISO 14644 standards, have experience cleaning ISO class 8 environments, and know how to address airborne contamination and particulate migration.

To help narrow down your list of choices and help you make an informed decision, also find out exactly what services a cleaning firm offers and what kind of quality you can expect. The cleaning service should also be able to provide a detailed list of what it cleans and how thorough it will be.

✓ *Understand Your Costs*

Cost for cleaning varies depending on what a provider offers as well as its reputation. But don't let price fool you. A lot of factors go into the overall price of a cleaning service, and you should make sure you get exactly what you're paying for.

Be sure to look at what is being cleaned for the price you pay and the level of cleaning being performed. There may be specific situations, such as after construction or in the wake of a disaster, where you will need more in-depth cleaning services than on an annual floor cleaning. One type of cleaning may take more time than another, which could affect the overall pricing of the service, as well.

✓ *Know What To Clean*

Some parts of your data center will need to be cleaned annually, while

others will require quarterly or biannual cleanings. But it's a fairly safe bet that, at some point, everything in your data center will need to be cleaned. Create a cleaning schedule for the building itself as well as the equipment and stick to the plan.

Make sure your cleaning schedule covers all access floors and floor panels, walls, ceilings, light fixtures, server racks, UPS units, panels, and more. The best cleaning firms have practices in place that will leave no stone unturned.

✓ *Set Clean Policies So Your Data Center Stays Clean*

Between cleanings, institute policies that limit the access employees have to certain areas of the data center as well as what they can bring into the room itself. If you can get your employees to treat the data center as a sterile environment and decrease the amount of foreign contaminants, it will make the cleaning crew's job easier and potentially lower your costs. ■

BUYERS' CHECKLIST

- ✓ Check to see if your provider is a member of the Association of Data Center Cleaning Professionals.
- ✓ Require that employees be background-checked and drug-screened.
- ✓ Get a detailed scope of work.
- ✓ Periodically check the work in progress.
- ✓ Limit what types of liquids and/or chemicals are allowed in the data center.

KEY TERMS

airborne contamination

Gaseous and particulate contamination that can lead to equipment failure; it's often gauged by particulate sampling.

ISO 14644-1

An international standard for air cleanliness in cleanrooms and associated controlled environments.

particulate migration

The movement of contaminants from one sector or piece of equipment to another, often as a result of the contaminant changing form as it's crushed and spread.

plenum

An enclosed space (often beneath floors or in ceilings) used for HVAC, cabling, etc.

BUYING TIPS: KVMs



THERE’S LITTLE DOUBT that KVMs offer plenty of options. Brett Femrite, Rackmount Solutions director of business development (866/207-6631; www.rackmountsolutions.net), says models include simple desktop options that control a handful of computers up to enterprise-level, IP-based KVMs with integrated matrix switching that let multiple users simultaneously access different devices.

✓ *Pick A Knowledgeable Vendor*

Most people purchasing KVMs are familiar with KVM switching technology, but they are not so well-versed in the available offerings, says Jeff Clark, president of Lindy USA (888/865-4639; www.lindy-usa.com).

If you don’t have time learn about all of the offerings, carefully consider the aptitude of the vendor partner you are working with, Clark says, and be transparent about your needs and future growth plans. “A good KVM vendor can help place the right system in your hands, but in order to do that, you must take the time to include this vendor in the initial planning stages,” Clark says.

✓ *Consider Security*

Buying a KVM with secure IP remote user access is essential to reducing manpower and negating the need for onsite operation by enabling administrators to gain BIOS-level access to servers, says Anthony Yim, general manager of Austin Hughes Solutions Inc. (510/794-2888; www.austin-hughes.com).

Femrite says you need to consider automatic time out, which disconnects users after a specified period of inactivity. A priority feature for data centers with multiple users accessing the enterprise’s devices is permissions-based access rights, which grants specific users access to only the devices and administration levels they need.

✓ *Factor In Compatibility*

Be sure to account for compatibility, Femrite says. Determine the number of devices you want to connect, hardware devices you’ll connect to it (mouse, keyboard, monitor), and the connection types (USB, PS/2) you need. Compatibility with the monitor you’ll connect the KVM to (DVI or VGA) is also essential.

✓ *Check For Devices & Users*

KVMs have a limited number of servers and devices they can directly control. Will Beene, rack specialist and technical account manager at Rack Solutions (888/903-7225; www.racksolutions.com), says you need to know how many users can be supported both locally and remotely. KVMs are offered in a variety of port densities, so you should be able to find one that perfectly fits your needs.

Yim says you can reduce KVM hardware expenditure and simplify management with a KVM that offers simultaneous multiuser access from different locations on devices connected to the same KVM switch.

✓ *Determine The Distance*

Determine the maximum distance you need to connect devices to the KVM. “If further than approximately 25 feet, you should opt for a CAT5 cable vs. the standard KVM cable kit,” Femrite says. If the servers are too far away for the cabling to reach, you may need to invest in a KVM extender.

Yim adds that new CAT6 KVMs can minimize distance-related problems as a CAT6 cable with interface dongle can support up to 130 feet without signal weakness.

You could also invest in KVM over IP, which lets staff control servers from anywhere using an Internet connection. The KVM over IP switch will also feature an encryption protocol that will help secure the data you send over the network.

“KVM over IP allows the servers to be further away from the KVM switch; however, Service Access Modules (SAMs) are required,” Beene says. “You have to weigh the cost vs. the benefits. In large organizations with distributed systems, KVM over IP is an easy method of administration and management.”

✓ *Plan For The Future*

Clark says you need to consider the flexibility of the system you are buying. “How do units chain together and how does chaining affect performance (video bandwidth, etc)?”

Be sure to factor in future additions or purchase a KVM that can daisy chain or cascade to avoid having stranded assets you outgrow, Femrite says. Pay attention to the cost, benefits, and expandability of the KVM switch. P

KEY TERMS

cascading

Connecting KVM switches together in a chain by attaching one switch to the computer port of another.

converter

Converts the KVM signal from one platform to another.

KVM extender

Allows the KVM signal to travel over a greater distance than it would have previously.

KVM over IP

The ability of the local or remote user to monitor and access the entire data center and remote offices over the Internet using a Web-based browser.

KVM sharing

Enables multiple users to access the same KVM.

matrix switching

The ability to have multiple users access multiple target devices independently.

BUYERS’ CHECKLIST

Anthony Yim, general manager of Austin Hughes Solutions Inc. (510/794-2888; www.austin-hughes.com) offers this list of features to look for:

- ✓ Do you need traditional DB-15 cables or CAT6 cables with an interface dongle?
- ✓ Does the KVM support secure IP remote access?
- ✓ Do you need a single local console or multiple consoles with IP remote access features?
- ✓ Will the KVM be standalone or integrated with an LCD keyboard drawer?
- ✓ Will you have a single user or concurrent users?
- ✓ Does the KVM have multiplatform connectivity so you can mix legacy hardware platforms between DVI, USB, PS2, and Sun solutions?

BUYING TIPS:

Understand The Used Market

How much do you know about the used equipment marketplace? There’s a lot of potential for misunderstanding and confusion. But with a better understanding of the used market, you can make a solid decision as to whether purchasing used is an avenue your business can benefit from.

Know What The Gray Market Is

Ask a group of IT professionals what the gray market is, and you’ll likely get a variety of answers. Is it knock-off equipment from overseas? It is equipment with dubious origins? The answer to both is a vehement “no.” The common definition of the gray market is “the sale of equipment through channels that aren’t licensed or authorized by the original manufacturer,” and it’s both legal and legitimate.

The stigma—and confusion—associated with the gray market has prompted many resellers to undertake an ad-hoc rebranding campaign. “Used market” suffices for many, while others prefer “green market,” pointing to the environmental advantages of

keeping equipment in the marketplace and reducing landfill materials. Whatever you call it, the gray market offers smart buyers quality equipment at attractive prices.

Go With An Established Reseller

There’s no shortage of sources for used and refurbished gear, whether it’s via company bankruptcies, liquidators, leasing companies disposing of hardware rotated out of service, and so on. The gamble, though, is that not all used equipment dealers may thoroughly test the equipment, load it with the proper firmware, properly pack it for shipment, or be ready to furnish support if there’s a problem. Be sure you’ve thoroughly vetted any company you’re purchasing from and that you understand what testing and repair the equipment has gone through.

Know Sources For Used Equipment

Concerns about the origin and authenticity of used equipment continue to

dissuade enterprises from giving the secondary market a serious look. But instead of shying away from the refurbished route, organizations should embrace the amount of high-quality used equipment currently available.

Typically, used equipment comes from three different sources: direct from other data centers that are upgrading, equipment coming off lease, and asset recovery or disposal channels such as banks, auction houses, and salvage companies that have been called in to help recover cash from businesses that have downsized or gone out of business.

Learn What Items Make Sense To Buy Used

Darin Stahl, Info-Tech Research Group analyst, says the economic downturn and virtualization have caused enterprises to view their equipment differently.

“The refresh cycle on the equipment has gotten longer, so what that means is there’s less available used equipment because they’re hanging on to this stuff

and wringing every ounce of usefulness out of it,” he says. For example, the most common refresh point for servers is five years, but Stahl says 22% of his customers are pushing that to six-plus years. Less than 14%, he says, are refreshing servers at the three-year mark.

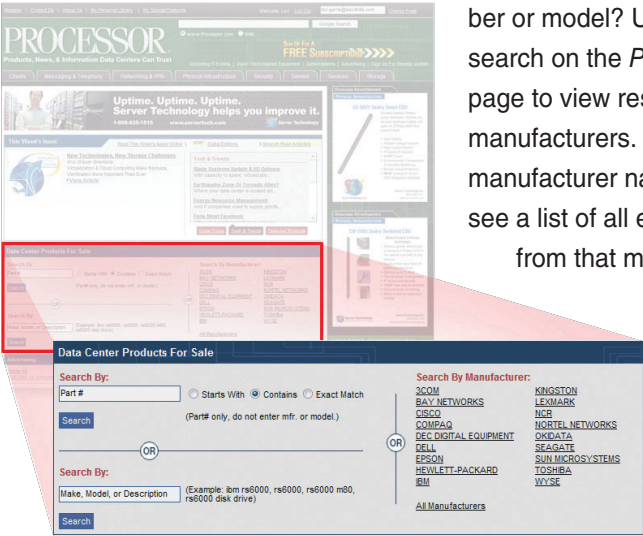
Along those lines, Stahl says, UPSes, HVACs, and other data center equipment had been good candidates for recycling and/or reuse, but companies now aren’t typically refreshing these until the seven-year mark.

In the past, he says, this wasn’t a big deal, but “what’s gone on if you start looking at the efficiencies in a precision cooling system or an HVAC unit for a server room that’s five years old, that delta between what you bought five years ago or seven years ago is very dramatic.” That’s why it’s important to do a thorough investigation of any used equipment you purchase and the reseller you’re purchasing from to ensure you’re getting adequate useful life left from the product and that the reseller stands behind the product.

Use PROCESSOR.COM To Find DATA CENTER EQUIPMENT

Looking for help pinpointing the products you need, from vendors you can trust? Finding the equipment you need is easy with Processor’s online Data Center Products For Sale database.

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BUYING TIPS: PDUs



PDUs HAVE EVOLVED into integral components of a modern power distribution infrastructure. “A well-thought-out data center power distribution implementation will lead to reduced downtime and improved power monitoring management and control capabilities and drive greater energy efficiency,” says Bob Parente, sales engineer at Server Technology (800/835-1515; www.servertech.com). Here’s what to look for.

✓ *Take Inventory Of Your Needs*

Brett Femrite, director of business development at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says to do your homework prior to making a PDU purchase. “It is critical that the PDU you select match up with your power consumption needs and server/network equipment.”

Make note of whether you can daisy-chain for added capacity, which could save money later. Femrite says other key factors to consider include form factor (vertical/horizontal, rack/wall-mountable, or 0U) and the amperage the PDU needs to support.

Be sure to perform full load testing during evaluation to determine heat rise of the internal connections, says Alex North, director of business development at BayTech (800/523-2702; www.baytech.net). And make sure the PDUs you purchase have the correct outlets and outlet counts, says Andy Grav, technical sales engineer at HM Cragg (800/672-7244; www.hmcragg.com).

✓ *Understand The PDU Options*

Femrite says there are generally three types of PDUs: basic, metered, and switched. A basic PDU lacks monitoring and remote administration capabilities. A metered PDU adds a meter that lets users visually track amperage and management software to monitor the aggregate current being drawn on each PDU. Switched PDUs add local and remote control capabilities on a per-outlet level. Redundancy is also important, Femrite says. A dual-circuit PDU offers added fault tolerance with two power inputs.

BayTech’s North says most rack PDUs look similar. “Evaluators need to open up the hood of all PDUs they are considering and use sound engineering-based judgment to evaluate the method of power distribution the manufacturer employed in the strip.”

✓ *Think Intelligent*


“When thinking about PDUs, think intelligently,” says Carrie Higbie, global director of data center solutions and services at Siemon (860/945-4200; www.siemon.com).

The real-time monitoring capabilities of intelligent PDUs play a key role in spotting and preventing problems, she says, adding that alarms should identify power and environmental problems and give the data center manager the ability to remotely restart or shut down equipment. “The cost delta between basic PDUs and fully featured intelligent PDUs is negligible when compared to cabinet equipment and energy costs,” she says.

Today’s lights-out data centers are using switched and managed PDUs, Grav says. “Both of these options allow the end users

to monitor the data center from a distance while still having control of the equipment by remotely logging into the PDU and being able to cycle stuck equipment off/on,” he says.

✓ *Account For Growth*

Make sure the PDU can handle your needs both now and into the future. “If you don’t precisely match up the PDU with your power consumption needs, taking into account anticipated growth/increases, you can wind up having a breaker tripped,” Femrite says. 

BUYERS’ CHECKLIST

Bob Parente, sales engineer at Server Technology (800/835-1515; www.servertech.com), recommends asking these questions when selecting a PDU:

- ✓ What is the expected maximum power needed to the rack?
- ✓ What voltage can be supplied to the rack?
- ✓ Does the expected max power include planned power redundancy and growth?
- ✓ Will each rack be designed for power redundancy with a standard A and B Input feed configuration?
- ✓ What types of devices are being connected in the rack?
- ✓ Single or dual power supply devices?
- ✓ Do you know the power factor for the devices within the rack?
- ✓ How many and what types of outlets are required (C19, C13, NEMA 5-20R, etc.)?
- ✓ What racks are being used (mounting considerations)?

KEY TERMS

intelligent PDU

Any PDU that offers Web-based management, meter power at both the PDU and individual outlet level, and real-time power monitoring.

three-phase wye

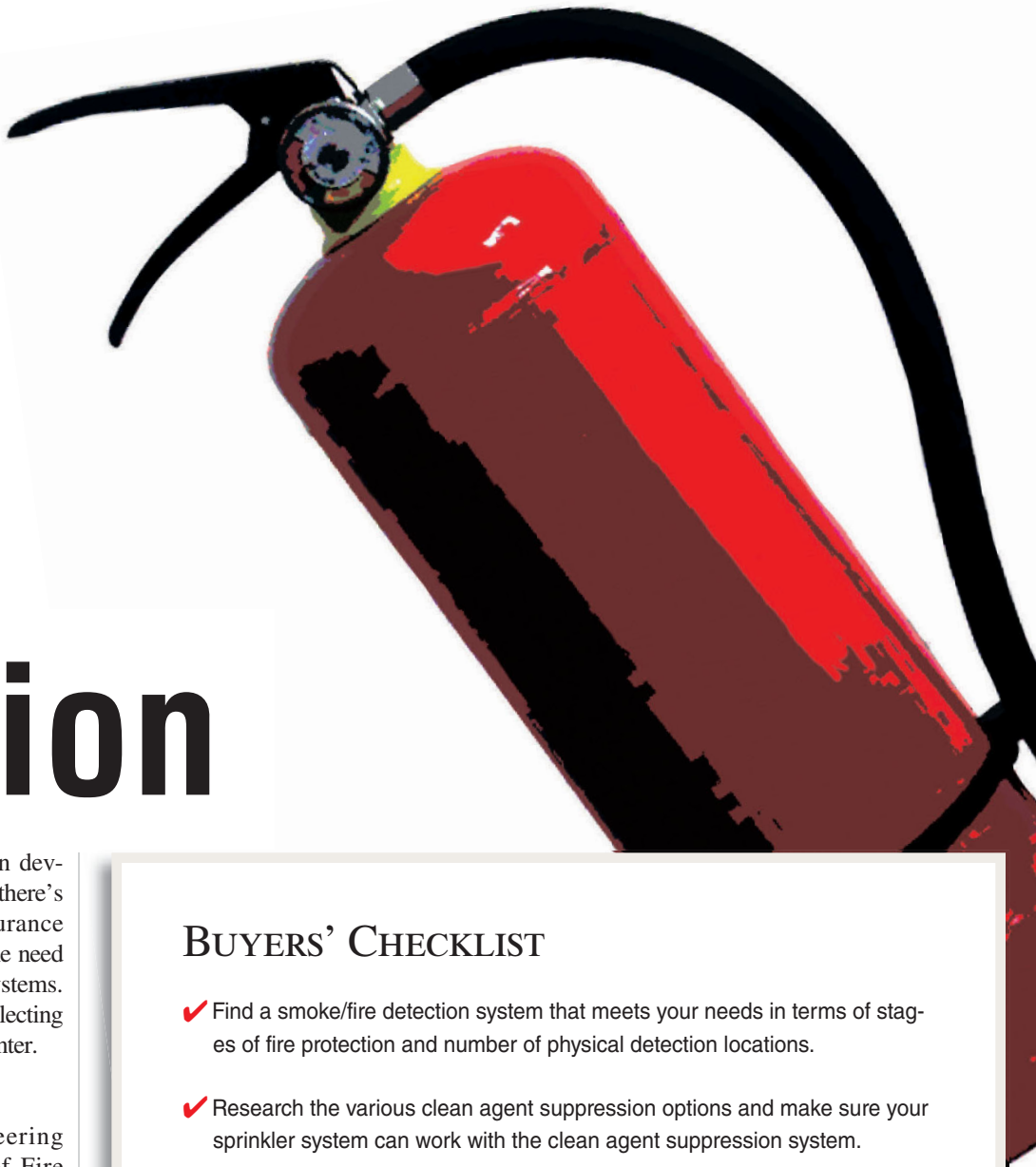
This system has a neutral wire that allows the three-phase system to provide a higher voltage (line-to-line, e.g. 208V) while still supporting lower-voltage single-phase (line-to-neutral, e.g. 120V) appliances.

zero-U mounted PDU

Most PDUs mount horizontally in standard EIA 19-inch cabinets. Cabinet designs that leverage the vertical space between cabinets to create a zero-U cabling zone for PDU mounting and cable management offer space and airflow advantages.

BUYING TIPS:

Fire Protection



IN AN INSTANT, a data center fire can devastate a business. Beyond downtime, there’s equipment damage, escalating insurance rates, and other related costs—hence the need for fire protection and suppression systems. Here’s what you need to know when selecting a fire protection system for your data center.

✓ *Understand The Basics*

Chris Jelenewicz, P.E., engineering program manager at the Society of Fire Protection Engineers, says there are several factors to consider when installing fire protection systems, including the building’s structure, occupants, first responders, and equipment. Jelenewicz says both active fire systems (sprinkler, gaseous, alarm and communications, smoke management, etc.) and passive fire systems (fire doors, walls, etc.) are necessary to protect people, property, and structures. Both system types “should be designed so that they work together as one complete fire protection system.”

Melanie Davy, analyst at Info-Tech Research Group, says at a minimum, a data center must have a sprinkler system, fire detection and alarm components, portable fire extinguishers, and emergency power-off abilities (according to NFPA 75). Other forms of protection, such as clean-agent suppression systems, are classified as add-ons.

✓ *Decide Between Water & Non-Water Options*

Fire protection is generally broken down into water and non-water options. The obvious downside to using a sprinkler system is that electronic devices and water can be a bad combination, especially in situations that are started by electrical fires. Thus, most data centers opt to go with a clean agent or aerosol agent suppression system, which is designed to leave no residue and is safe for both electronics and people, unlike some chemical-based fire protection.

✓ *Know Your Alert Choices*

You’ll need to know at what stage during a fire the detection system should trigger the suppressant to release. Effective detection is key, as the suppression system is only as good as the detection system initiating the release.

Invest in a smoke and fire detection system that can alert employees and IT staff to problems. Some models are capable of detecting the various stages of a fire, such as visible smoke vs. flaming fire vs. intense heat, to allow you to set off alarms or activate various stages of fire protection.

BUYERS’ CHECKLIST

- ✓ Find a smoke/fire detection system that meets your needs in terms of stages of fire protection and number of physical detection locations.
- ✓ Research the various clean agent suppression options and make sure your sprinkler system can work with the clean agent suppression system.
- ✓ Invest in an emergency power off system to shut off electricity when a fire is detected.

KEY TERMS

aerosol agent

A type of fire suppressant system that leaves little residue and won’t damage equipment. Does not require a sealed air-tight space as the agent does not pressurize the protected area when discharged.

agent storage container

The assembly or unit that stores the clean agent fire suppression liquid until it needs to be released when prompted by the suppression control panel.

Class C

Fire breakouts that involve electrical equipment where a non-conductive extinguishing agent must be used.

clean agent

A type of fire suppression system that leaves no traces behind.

deluge

A system where all the sprinklers connected to the water piping system are open. If the deluge valve opens due to a signal, the entire area will be sprayed with water.

early warning smoke detector

A passive detector that uses ionization and photoelectric sensors.

heat detector

A unit that sends a response when the convection of thermal energy changes the temperature of the device’s heat-sensitive element.

suppression control panel

The unit that houses the interface you use to control the fire protection system.

very early warning smoke detector

A smoke detector that samples air particles via aspiration to find non-visible smoke.

BUYING TIPS:

Storage



YOU SPEND A LOT OF MONEY on storage, and you need to make sure every dollar you spend is a good investment. With so many options available, including cloud, in-house, or some combination of both, it’s more important than ever to have a solid understanding of what’s available and what’s most important for your enterprise.

✓ Do Your Homework & Know Your Goals

When narrowing your storage options, careful research is invaluable. “Do your homework, but don’t over-analyze,” says George Crump, senior analyst at Storage Switzerland. Crump suggests discussing your project with one systems vendor, one new-but-established vendor focused on the mid-range, and one startup.

Crump says you should have a clear goal. “Do [you] need more capacity, more performance, better data protection, [or] some or all of the above?,” he asks. Be clear about your company’s business requirements, business strategy, and networking strategy, including bandwidth requirements and available facilities and services.

Greg Schulz, senior advisor at Server and StorageIO Group, recommends stepping back from comparing tools and technologies initially and instead reviewing service-level objectives and requirements, including RTO and RPO. Also be sure to give serious thought to how much of the new storage could be in the cloud, whether public (third-party) or private (in-house).

✓ Inventory Your Data

Have a clear understanding of your data and requirements. Inventory the type of data you have today—how much is in databases, email, files, and other formats. Crump says a good set of storage analysis tools can help you evaluate how you’re currently using your IT resources.

✓ Spend What’s Needed

Storage can be expensive, but you get what you pay for. “While everyone wants to spend pennies to save dollars, real data protection may cost dimes, not pennies—but you’ll still be saving dollars,” says Jason Buffington, senior analyst with Enterprise Strategy Group.

Often, management may underestimate the financial impact downtime or lost data has until it’s too late, he says. “In today’s market, that may mean losing a key client or potentially being unable keep the doors open just because you can’t get your data back,” he says.

✓ Consider Outsourcing Storage Management

Mike Karp, vice president and principal analyst at Ptak, Noel, and Associates, says for small to midsize enterprises, most often the best option is outsourcing storage management, particularly where getting the most out of your storage and doing it with the greatest efficiency is concerned.

“Third-party providers often have a huge competitive advantage when it comes to providing storage services, and if an IT manager can make a good business case for outsourcing many of the storage responsibilities . . . they can spend more time doing the things that they do best and offload the things that they can’t do with greater efficiency to somebody who can do them in a cost-effective manner.”

BUYERS’ CHECKLIST

Here are some things to keep in mind as you formulate your storage strategy:

- ✓ **Data safety.** Keeping your precious data safe is vital to profitability, so be sure to implement redundancy and strong error correction, as applicable.
- ✓ **Uptime.** You need reliable devices and software, along with failover protection (both emergency power and redundant data storage systems). You’ll also need support from the vendors, relevant manufacturers, and/or developers.
- ✓ **Security.** Consider all elements, including user access policy, encryption, firewalling, and malware prevention.
- ✓ **Speed.** How fast your storage works is important. SSDs will have a role in most data centers.
- ✓ **Manageability.** Your organization may require new software for storage management, data protection, support, and future storage planning.
- ✓ **Cost-effectiveness.** Think not only in terms of cost per gigabyte, but also cost per I/Ops. Deduplication, virtualization, and provisioning features can help you avoid wasting money and power on unnecessary drives.
- ✓ **Scalability.** Whichever path you take, make sure the result will let your data center grow with your organization’s needs.

KEY TERMS

cloud storage

Storage that takes advantage of offsite, third-party providers that maintain and manage the physical storage devices.

solid-state drive (SSD)

Data storage with no moving parts; it uses solid-state memory, or microchips, to store data, making data retrieval faster.

BUYING TIPS:

Data Center Furniture



FURNITURE IS THE REAL BACKBONE of your data center. That’s why purchasing furniture that matches your needs is essential. Here’s what to keep in mind.

✓ *Know Your Company*

The furniture you choose depends on the services your company provides. “Some companies need conference room furniture for secure and private consultations, and others, such as network centers, might utilize server cabinets or colocation cabinets and racks,” says Susan Wynne, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net)

✓ *Research Available Vendors*

A solid data center furniture vendor will have a long track record of providing high-quality products and services. That ensures you can view it as a partner and work with the company for years to come. “You want a vendor that you can invest in for the future,” says Eli Hertz, CEO and president of Hergo (888/222-7270; www.hergo.com). “You don’t want to deal with a company that will only be around for a one-time purchase.”

Also, be sure to research all of your available options. “Look for a reputable company with knowledgeable sales staff and one with short lead times,” Wynne says. She also recommends spending more money upfront on quality products from a long-standing vendor. “The initial investment may be more

than you wanted to spend, [but] the furniture will stand the test of time.”

✓ *Check For Quality*

Once your budget is established, you can get the best value for the dollars you spend by looking for the best materials for your price range. For example, the frame makes a big difference in a piece of furniture’s durability. Especially for desks, a steel frame with cross supports is going to be the most durable model. As for surfaces, high-density laminate and high-density pressboard are good choices.

✓ *Make Sure It Fits The Space*

Before buying furniture, do some planning first, Wynne says. “Know the function of the room. Have in mind a design or layout of the space you’re wanting to create. A sketch or draft of the room with the various components in place is helpful,” she says.

Know the dimensions of the space and furniture to ensure you meet requirements. Also helpful is knowing how a workstation will be used and by how many people to ensure overall comfort. Be sure to note whether the surface of the furniture has a lip of some kind that makes it wider at the top than at the bottom, and don’t forget to leave space for drawers to pull out in cabinets or for people to work in front of the furniture.

Marking the space with tape can show you how much space the furniture takes up as well as what kind of walking space will be

left over once it’s there. If you prefer not to do it yourself, many furniture vendors offer design templates or free space planning.

✓ *Use Your Space Efficiently*

You can save money without sacrificing quality by making sure you are using space efficiently. One way to do this is to go vertical rather than horizontal, possibly by investing in pieces of furniture that are wall-mountable. “Office and lab space is at a premium,” says Kristen Speranza-Diamond, vice president at Hergo. “It’s beneficial to go vertical and make the best use of square footage.”

Speranza-Diamond says that most necessary pieces of furniture and equipment for data centers are becoming less expensive, “so everyone is upgrading and making the transition to go compact.” Manufacturers are putting more advanced technology into smaller packages, which will help you put more equipment into each piece of furniture.

✓ *Focus On The Future*

Be sure to look for key features, such as height-adjustment for chairs or cable management systems for racks. If you invest in modular furniture with swappable pieces, you’ll have room for future growth, Wynne says.

Choose furniture that will have a long lifespan. “You have to know that your current furniture will still be available in six or 12 months should you wish to duplicate or expand,” Wynne says.

KEY TERMS

adjustable height

Refers to components users can raise or lower for a better individual fit. Some higher-end furniture can be adjusted electronically.

cable management

Built-in grommets, channels, or other features to manage cables and wiring.

modular

Furniture components that are interchangeable or can be easily modified.

BUYERS’ CHECKLIST

- ✓ **Seek out quality.** Although looking for deals can help companies on a tight budget, sacrificing quality as a result can end up costing companies more in the long term, especially if buying from vendors that don’t offer lifetime warranties on furniture.
- ✓ **Know the delivery terms.** Determine if the delivery includes bringing it inside the facility, requires a lift gate or loading dock, and includes assembly or puts the responsibility on you or a third-party installer.
- ✓ **Go modular when possible.** Buying components that are interchangeable lets you modify the setup to meet changing needs, including downsizing or expanding space. Increasingly, individual furniture units can be mixed and matched and layout configurations easily altered.
- ✓ **Build vertically.** Purchase components that support building vertically for better space efficiency.

BUYING TIPS:

Cable & Airflow Management



MANAGING CABLES is an afterthought. That’s an unfortunate reality among many data centers, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). Among other things, poor cable management leads to performance problems and issues with troubleshooting and airflow.

✓ *Know What’s Available*

Brett Femrite, sales manager at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says well-designed patch cable storage managers, which house and cover patch cords between patch panels and devices, are popular. He says they are not only functional in helping reduce cable sprawl, but they are also bend-radius-compliant and offer cosmetic appeal. Other cable management options include horizontal and vertical wire managers (which can be mounted on the front or rear of your equipment rack or cabinet), cable ladders, a large assortment of cable trays and conduits, and various wire minders (rings) that can be mounted on any rack system.

Also very popular, Femrite says, are vertical and horizontal lacer bars. “These bars can be mounted on a rack or within a cabinet and have slots through which Velcro enclosures or cable wraps are routed to hold groups of cable,” he says.

Carrie Higbie, global director of data center solutions and services at Siemon (860/945-4200; www.siemon.com), says larger and wider cabinets, such as the 48-inch deep cabinets many companies are purchasing today, can allow for vertical patching or even just more room for power and communications cabling. Baffles for side discharge equipment are an important part of managing airflow.

✓ *Plan For Expansion*

Laura Viars, senior sourcing specialist at Rackmount Solutions, says to be sure your cable management configuration allows for future equipment additions. Do this by making certain managers (both in-rack cable managers and external trays and ladders or conduits) don’t meet or exceed their fill capacities. Most management options are available in multiple sizes, she says, ensuring a fit with plenty of excess if needed.

Also seek solutions with the flexibility to add new equipment or troubleshoot an existing component. “Lean toward reusable options such as Velcro straps in lieu of cable ties and managers that allow easy access to their contents,” she says. If you expect rapid and near-term growth, keep

cables loosely organized during implementation by cutting down on the bundling and by using managers (D-rings vs. managers with covers) offering easier access.


✓ *Avoid The Swing Arm*

Server-mounted swing arms are a common solution for cable management, Higbie says, but they actually cause problems with airflow and cooling. “Swing arms route cable horizontally across the equipment, blocking exhaust fans and spaces critical to proper hot aisle/cold aisle airflow,” she says.

You can eliminate server swing-arm doors by routing cords and cable directly into zero-U vertical patch panels or cable management channels, Higbie says, which dramatically reduce the airflow disruption in the horizontal

cabinet space seen in traditional cabinets with swing-arm doors. “Plus, you get greater cable capacity, simpler cable management, and a much better looking installation.”

✓ *Consider Color & Labeling*

Koty says when possible, use color coding to help visually identify and trace cables and simplify management. With data cables, use color to identify the cable’s role/function or connection type. With power cables, use color to identify and organize dual-power feeds for redundant power sources. Secure labels so they’re accessible but difficult to remove. Also, maintain a spreadsheet that identifies the cables and colors, where cables come from and go, and configurations. 

BUYERS’ CHECKLIST

- ✓ **The basics.** Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says no matter the size of installation planned, you’ll likely need basic management items such as vertical managers to bundle cable along the height of the racks/cabinets; horizontal managers to bring the cabling neatly from the drop to the equipment; and Velcro straps to bundle cables as needed.
- ✓ **Testing.** Pre-test all cable before installing, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). Once installed, it’s more difficult to test and identify problems.
- ✓ **Think about heating and cooling.** Where heating and cooling efficiency are concerned, Koty says, using overhead racking for network and storage cables will prevent air dams from forming under the floor. Also, be sure your cable management solution keeps cabling out of the way of exhaust fans in cabinets, he says.

KEY TERMS

cable bend radius

The minimum radius a cable can acceptably bend and still function as intended.

TIA/EIA

The TIA (Telecommunications Industry Association) and EIA (Electronic Industries Alliance) provide best practice guidelines regarding cabling infrastructure.

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LINDY USA specializes in cables, adapters, electronics and accessories for computer, networking and audio video applications. Since 1932 Lindy has supplied high quality interconnects to customers in commercial, telecom and residential markets. What sets us apart is our complete dedication to innovation, performance and reliability. Our cabling products are truly outstanding.

Products Sold:

- Networking Products • Audio / Video • KVM • Sharing, Converting, Extending • USB and FireWire • Input Devices • Add-On Cards • Hardware and Security • Power • Cableless • Adapters and much more!

(888)-865-4639 | www.lindy-usa.com/

PHYSICAL INFRASTRUCTURE



Atlas has specialized in portable air conditioning since 1979 and leads the industry in server room and data center portable cooling. We offer “24/7” response from company-owned, full-service offices around the country, each stocked with a wide inventory of equipment for primary, supplemental, or emergency cooling. All portable items are available for sale or rental. Atlas is a Preferred MovinCool® Distributor and a GSA Certified MAS Contractor.

Products Sold:

- 1-5 ton portable air conditioners, air and water-cooled
- 12-ton portable coolers designed to roll through a standard doorway
- Ceiling-mount air conditioners – full line of MovinCool® packaged a/c units

(800) 972-6600 | www.AtlasSales.com

PHYSICAL INFRASTRUCTURE




BayTech was founded in 1976 and, since the 1990s, has developed unique products for remote power management. The company uses printed circuit board instead of wires for a better, more resilient connection between the data center equipment and the receptacle. BayTech provides an extensive Web site with brochure downloads, warranty information, and reseller support and also offers evaluation units for data centers.

Products Sold:

- Power control, distribution, management, and metering
- Power transfer switches
- Console management and remote site management

(800) 523-2702 | www.baytech.net

PHYSICAL INFRASTRUCTURE




PDU'sDirect.com is a Master Distributor of select Server Technology PDUs for server and networked environments. PDU's Direct's basic, metered, and switched Rack PDUs provide local and remote power management, power monitoring, and environmental monitoring. We pride ourselves in offering industrial-grade quality products at the lowest prices, with the fastest shipping (most orders shipped within 24 hours) and simplest purchase process. We are the Power Behind the Business.

Products Sold:

A complete line of metered and basic PDUs, and 20A switched PDUs.

(888) 751-7387 | pdudirect.com

PHYSICAL INFRASTRUCTURE




Rackmount Solutions' mission is to listen to the IT engineer's specific needs and deliver superb-quality, high-performance products through continuous product innovation and operational excellence. We pride ourselves in providing quality customer service, products that fit your IT requirements, and solid value for your money.

Products Sold:

- Wallmount and server racks and cabinets, including sound proof, air conditioned, and large cable bundle
- Desktop/tabletop portable racks
- Shockmount shipping cases
- Bulk cable

(866) 207-6631 | www.rackmountsolutions.net

PHYSICAL INFRASTRUCTURE



PDU Cables is the leading supplier of power distribution cables assemblies to data centers in North America. PDU Cables has been serving this industry since 1981 and is the first independent cable assembly company to introduce colored conduit into the power distribution cable market, the first to get UL 478 listing, and the first to introduce the Power Cable and Equipment Configurator software tool. The company is centrally located in Minneapolis, Minn., allowing it to offer 24-hour turnaround and shipping time of just one or two days to almost any United States destination.

Products Sold:

A range of power cables, cable seals, and power cord assemblies.

(866) 631-4238 | www.pducables.com

PHYSICAL INFRASTRUCTURE




Sensaphone has been designing and manufacturing remote monitoring systems for more than 25 years and has more than 300,000 of its products in use. Sensaphone's product lineup offers a full range of devices with a broad number of features and applications designed to monitor your entire infrastructure and alert you to changes. All product engineering functions, including hardware and software design and circuit board layout and assembly, are performed at the Sensaphone facility in Aston, Penn.

Products Sold:

Remote monitoring solutions that provide email and voice alarm notification for problems related to temperature, humidity, water detection, power failure, and more.

(877) 373-2700 | www.sensaphone.com

PHYSICAL INFRASTRUCTURE



Founded in 1995, Austin Hughes Electronics Ltd is a design and manufacturing group that offers a broad range of solutions based around 19 inch rack mount technology. With a wealth of experience Austin Hughes design and development teams are focused to rapidly transform customer requirements and market trends into saleable solutions.

Products Sold:

- Infra solution Cabinet Smartcard Handels
- InfraPower Cabinet Intelligent PDUs
- CyberView Rackmount KVM & LCD Console Drawer
- Environmental Sensors

(510) 794-2888 | www.Austin-Hughes.com

PHYSICAL INFRASTRUCTURE



The Mestex division of Mestek is comprised of seven company brand names: Applied Air, LJ Wing, Aztec, Alton, Temprite, Koldwave, and Sierra. Mestex is involved in emerging technology and product research focused on using energy and water more efficiently, including ways to improve data center efficiency by using outside air, evaporative cooling, and optimized DDC control schemes.

Products Sold:

- Mechanical and evaporative cooling products
- Heating products
- Outside air tempering products
- Packaged evaporative cooling solutions for mission-critical applications

(214) 819-5262 | www.mestex.com

PHYSICAL INFRASTRUCTURE



Data Aire, Inc. has been designing and manufacturing precision cooling equipment for more than 40 years. We established some of today's industry standards, such as scroll compressors, steam generator humidifiers and microprocessor controllers. Our equipment can be found in any size organization or data center, from a closet to a Fortune 500 financial data center or government high security operation center. With our experience and expertise we can, and are willing, to design and build equipment to meet our customer's needs. With the shortest delivery times in the industry Data Aire can meet your requirements.

Products Available:

- Floor Mounted Units – CRAC or CRAH
- Ceiling Mounted Units
- Rack and Row Solutions
- Specialty Units
- Heat Exchangers
- System Controls

(800) 347-2473 | www.dataaire.com

PHYSICAL INFRASTRUCTURE




Server Technology is committed to the PDU market with the largest group of engineers dedicated to power distribution and other solutions within the equipment cabinet. Advancements in device power monitoring help data centers monitor and improve their efficiency, and continuous research and development is fueled by companies that look to Server Technology for their custom cabinet power solutions.

Products Sold:

A complete line of cabinet PDUs, including Per Outlet Power Sensing (POPS), Rack Mount Fail-Safe Transfer Switch, Console Port access with remote power management, Switched, Smart, Metered, Basic, and -48 VDC

(800) 835-1515 | www.servertech.com

PHYSICAL INFRASTRUCTURE




Geist is a leading data center provider for power strips, monitoring equipment, cabinet containment & in-rack cooling, and DCiM systems. Geist's power strips are tailored to meet each client's needs and provide unbeatable performance in the data center. Our industry leading monitoring and cooling solutions increase data center efficiencies and make going green easier than ever before.

Products Sold:

- Power
- Cool
- Monitor
- Manage

(800) 432-3219 | www.geistglobal.com

PHYSICAL INFRASTRUCTURE



RackSolutions has been serving the data center market for more than 10 years. All of our products are designed, engineered, built, and shipped under our own roof. We have product solutions available for every major OEM, but if one of our existing products doesn't fit your needs, our top-notch mechanical and electrical engineers can create the item you need from scratch, solving even the toughest installation design challenges. Best of all, we typically don't charge up-front fees for design services.

Products Sold:

Computer server racks, cabinets, shelves, and mounting products.

(888) 903-7225 | www.racksolutions.com

NETWORKING & VPN



Black Box is the world's largest independent provider of voice communications, data infrastructure, and product solutions. Shop at Black Box for 118,000+ networking products, a best-price guarantee, and FREE, live, 24/7 Tech Support.

Products Sold:

- Cabinets and racks
- Cables
- Datacom
- Digital signage and multimedia
- Industrial
- Infrastructure hardware
- KVM
- Networking
- Power
- Premise security
- Servers, storage, and PCs
- Voice communications

(877) 877-2269 | www.blackbox.com

PHYSICAL INFRASTRUCTURE



Based in New York City, Hergo Ergonomic Support Systems is an independent designer and manufacturer of enclosure cabinet solutions, technical computer furniture, and modular racking systems. The company's products are designed to promote organization in the workspace and to increase the productivity of computers, peripherals, and communications equipment. Hergo is known for its high-quality products and superior customer service.

Products Sold:

- Racks
- Enclosures/cabinets
- Motorized workstations
- Flat-panel arms
- Computer desks
- Cable management
- Power management

(888) 222-7270 | www.hergo.com

PHYSICAL INFRASTRUCTURE




AVTECH Software, founded in 1988, is focused on making the monitoring and management of systems, servers, networks, and data center environments easier. AVTECH provides powerful, easy-to-use software and hardware that saves organizations time and money while improving operational efficiency and preparedness. AVTECH products use advanced alerting technologies to communicate critical status information and can perform automatic corrective actions.

Products Sold:

A full range of products that monitor the IT and facilities environment, including temperature, humidity, power, flood, room entry, and UPS

(888) 220-6700 | www.AVTECH.com

PHYSICAL INFRASTRUCTURE



Since 1979, Simplex Isolation Systems has been setting new design standards in modular expandable cleanroom components, isolation curtains, hardware, and new product development. Fontana, Calif.,-based Simplex's unique strip doors and mounting systems are designed for quick installation. Simplex parts and materials perform with optimum efficiency, last longer, and save you money. And with Simplex, you are always backed by industry expertise, product knowledge, and the best warranties in the market.

Products Sold:

- Cleanrooms
- Enclosures
- Strip doors
- Curtains

(877) 746-7540 | www.simplexisolationssystem.com

PHYSICAL INFRASTRUCTURE



Headquartered in Connecticut, Siemon has been around since 1903 as a provider of high-quality cabling solutions designed to improve network connections, performance, and efficiency. The company manufactures end-to-end copper and fiber cabling systems, cabinets, racks and cable management solutions for data centers, and more. Siemon also has an R&D arm, Siemon Labs, which focuses heavily on innovation and shows the company's long-term commitment to its customers.

Products Sold:

- Cable management solutions
- Data center cabinets and racks
- End-to-end copper and fiber cabling
- High-speed interconnects
- Intelligent infrastructure management

(860) 945-4200 | www.siemon.com

NETWORKING & VPN




Metric Systems Corporation® designs and manufactures broadband wireless networking equipment, and end-to-end solutions for government and industry. We've been in the business of manufacturing and integrating reliable industrial-grade wireless networking systems for over 25 years. Our networks are deployed around the world protecting and supporting people and machines. Our specialty is working with your unique requirements and existing infrastructure to provide a networking solution that fits your requirements, schedule, and budget.

Products Sold:

Rhino Box® Environmentally Controlled Equipment Shelters and SAFARI™ Wireless Controllers and Radio Systems.

(800) 549-7421 | www.metricsystems.com

STORAGE



As the storage architecture authority, Area Data Systems has a 25-year track record of success built on the ability to deliver its clients cost effective, reliable and scalable storage for Cloud and Big Data solutions.

Area Data believes that storage solutions are not a one size fits all paradigm. The Area Data solution cycle employs an "engineer-to-engineer" approach to discover potential challenges to success for clients. Area Data will design, validate and recommend the appropriate industry certified storage solutions tailored to the needs of each client, based upon real world performance testing.

Products Sold:

- Storage solutions

(714) 993-0300 | www.AreaSys.com

STORAGE




For IT organizations that manage extremely large and growing volumes of data, Sepaton delivers the fastest, most scalable and most reliable enterprise backup and recovery solution in the world. Sepaton delivers performance of up to 400% faster than leading competitors, moving data to safety at an unmatched 43.2 TB per hour! Built on our patented DeltaScale™ architecture, Sepaton easily handles massive volumes of data, seamlessly scales to accommodate rapid growth and consistently meets the tightest of backup windows. Sepaton is headquartered in Marlborough, Massachusetts, and was founded in 2003.

Products Sold:

- A range of enterprise data protection products, with capacity from 10TB up to 2PB.

(866) 737-2866 | www.sepaton.com

STORAGE




Founded in 1991, Aberdeen is a leading manufacturer of servers and storage options for IT departments. Aberdeen products can be found in many of today's high-tech corporations, as well as government agencies, hospitals, and universities. Aberdeen prides itself on unmatched customer service, open and honest communications, long-term commitments to working relationships, and personal and professional integrity.

Products Sold:

- Components/parts
- Servers (barebones, custom, rackmount, and storage)
- Software
- Storage (DAS, iSCSI SAN, JBOD, NAS, SAN)

(800) 500-9526 | www.aberdeeninc.com

SERVERS




Supermicro® (NASDAQ: SMCI), the leading innovator in high-performance, high-efficiency server technology, is a premier provider of advanced server Building Block Solutions® for enterprise IT, data center, cloud computing, HPC, and embedded systems worldwide. Supermicro is committed to protecting the environment through its "We Keep IT Green®" initiative by providing customers with the most energy-efficient, environmentally-friendly solutions available on the market.

Products Sold:

- Servers
- Motherboards
- Chassis
- Network switches
- Storage solutions
- Blade servers
- GPU servers
- Embedded

(408) 503-8000 | www.supermicro.com

SERVERS




Chenbro is a leader in enclosure solutions, selling its products primarily to system integrators and OEM and channel partners. The company's extensive research and development efforts help it to keep its competitive edge and maintain market leadership, with special focus on thermal, EMI, and acoustic solutions. Taiwan-based Chenbro has offices in the United States, UK, The Netherlands, and China.

Products Sold:

- A comprehensive line of PC chassis, server/workstation chassis, rackmount chassis, and HDD enclosures.

(909) 947-3200 | www.chenbro.com

CLIENTS



The Smart Choice for Text Retrieval® since 1991, dtSearch® offers over 21 years of experience in parsing and searching data. The dtSearch product line includes enterprise and developer text search products, meeting some of the largest-capacity text retrieval needs in the world. dtSearch's website offers hundreds of developer case studies and press reviews. The company has distributors worldwide, including coverage in six continents.


Products Licensed:

Text retrieval products, including:

• Desktop with Spider	• Web with Spider
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• Publish (for portable media)	• Engine for Linux

(800) IT-FINDS | www.dtsearch.com

PHYSICAL INFRASTRUCTURE



As an integrator and master distributor providing quality power solutions, HM Cragg has built a reputation as the company that delivers innovation to aid and satisfy its customers. HM Cragg was founded in 1968 and is 100% employee-owned, focusing on quality people and exceptional products.

Products Sold:

- AC and DC power solutions (UPSes, power distribution)
- Control and monitoring (environmental and power)
- Connectors and cables (cord sets, ePDU cables)
- Cooling (air flow management, portable cooling)
- Racks and enclosures (standard racks, battery racks)
- Safety equipment (spill containment, safety signs)

(800) 672-7244 | www.hmcragg.com



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